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NATIONAL ESTUARINE POLLUTION STUDY. PROCEEDINGS OF THE PUBLIC MEETING HELD AT WILMINGTON, DELAWARE ON JUNE 27, 1968, AND WRITTEN STATEMENTS CONCERNING TIDAL WATERS OF THE DELAWARE COAST AND THE DELAWARE RIVER ESTUARY

Federal Water Pollution Control Administration
Boston, Massachusetts

1968

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NATIONAL ESTUARINE POLLUTION STUDY

Proceedings of the
Public Meeting held at
Wilmington, Delaware
June 27, 1968

and

Written Statements Concerning
Tidal Waters of the Delaware Coast
and the Delaware River Estuary

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PART I

Oral Statements Presented at the
Hotel Du Pont, Wilmington, Delaware
June 27, 1968

PROCEEDINGS

(The public hearing held by the Federal Water Pollution Control Administration was called to order in the Ballroom of the Du Pont Hotel, Wilmington, Delaware, on Thursday, June 27, 1968, at 9:30 o'clock A.M., Lester M. Klashman presiding.)

CHAIRMAN KLASHMAN: May I have your attention, please.

My name is Lester Klashman. I am the Regional Director for the Northeast Region of the Federal Water Pollution Control Administration.

To my extreme left is Mr. Gene Jensen, who is in charge of the National Estuarine Study being carried out by the Department of the Interior.

Mr. John Bryson, who is in charge of the Water Pollution Control Program, also the Air Program, for the State of Delaware.

To my right, Mr. Robert Shaw for the State of New Jersey.

Mr. Howard Luley, for the State of Pennsylvania.

And Mr. Herbert Howlett from the Delaware River Basin Commission.

We are all here because we feel our coastal and estuarine waters are among our most precious resources.

The purpose of this public meeting is to have your views on Delaware coastal waters and the Delaware River Estuary.

If for any reason any of you wish to speak about other estuaries and it is more convenient for you to present your statement here, we will of course receive it because this is one of many meetings which we are having all over the country in an attempt to obtain the views of the public to help us in preparing a final report for the Congress.

What we are interested in knowing is: What do you think about the values of an estuary, the aesthetic, recreational, dollar value? Have estuaries been damaged by pollution? Where? How much? What should the future of the coastal zone be? What are the best uses? What system of management will best provide for development of our coastal resources?

This public meeting is the first of five in the Northeast Region. We will be holding others in New York City on July 23, Hartford, Connecticut on August 19, Portland, Maine, on September 10 and in Boston, Massachusetts on October 8. These meetings are being held in accordance with the Clean Water Restoration Act of 1966.

The Federal Water Pollution Control Administratio is charged by the Congress of the United States to prepare a comprehensive report on the status of water pollution in the nation's coastal waters. The report will identify the actions needed to assure wise use of the total resources of our coastal zones so that not only will degradation of our valuable coastal waters be avoided, but also the quality of our waters may be enhanced. This effort is known as the National Estuarine Pollution Study. The report is scheduled for completion and submittal to the Congress on November 1, 1969. It will provide the Congress with the information it needs to draft legislation bearing on prevention and abatement of pollution in the nation's coastal waters.

When we talk about pollution, we talk about it in a very broad sense, meaning anything that is going to degrade the waters, which will include, of course, filling or the abuse of the resource in any way.

Because they feel our estuarine and coastal waters are so important, the States of Delaware, New Jersey and Pennsylvania and the commissions have joined the Federal Water Pollution Control Administration in co-sponsoring this meeting.

The men who I introduced to you previously are channeling information from the various agencies in their states directly to the FWPCA's Office of Estuarine Studies. Their chief is Mr. Eugene Jensen, whom I introduced to you previously. This is also true for other federal agencies and for the Delaware River Basin Commission, which is represented by Mr. Howlett, who was also introduced to you previously.

We have sent out over 300 invitations to all the organizations we thought had an interest. However, we want to assure you that this is a public meeting and statements from all are welcome.

Those of you wishing to speak should so indicate on the registration cards that you made out when you entered. You will be asked to come to the rostrum in turn. The panel members may wish to ask clarifying questions, but we are not prepared to entertain questions from the floor. Our purpose is to collect information and not to provide a forum for debate. If you decide to make a statement and have not yet so indicated on your registration card, please inform the secretary at the registration table so that we can schedule you.

Those of you wishing to submit written statements either now or in the next few weeks are welcome to do so. The secretary will take them or tell you where to mail them.

We have also received written statements or promises of statements from the Outboard Boating Club of America, the Delaware Nature Education Center, the Gloucester County Citizen's Association, and Mrs. Robert Barrett of

Haddonfield, New Jersey.

We have a 35-millimeter slide projector and an overhead projector. If you wish to use these, would you please inform Mr. Farlow, who will be located down here, that you wish to use this equipment. Or if you have any other equipment, any other projection equipment, that you wish to use, if you would notify him, we will arrange to see that assistance is given.

These proceedings are being taken by a reporter and will be published and sent to you. That is why we need your address on the registration card. The written submissions will be includedin the record. If you are planning to speak and have a written copy or outline, it would greatly aid the reporter if you would let our secretary make a Xerox copy of it in advance. We have a Xerox machine outside. It would also be of help to the panel if you provided the statement ahead so that copies could be made and we could follow you more easily.

Our first speaker will be--

FROM THE FLOOR: May I interrupt, please.

The acoustics in here are terrible. Can we have the air conditioning shut off so we can hear these speakers and you and the other gentlemen?

CHAIRMAN KLASHMAN: We will try to improve the volume of sound. May we have the sound turned up, please? Can you hear me in the back of the room now?

FROM THE FLOOR: Much better.

CHAIRMAN KLASHMAN: I am afraid we cannot turn off the air conditioner in an inside room like this because of other problems.

The first speaker will be John H. McDonald, Legislative Assistant for Representative William Roth. Mr. McDonald.

MR. JOHN H. McDONALD: Thank you, Mr. Klashman.

Distinguished members of the panel:

I am delighted to have this opportunity to speak to you briefly on behalf of Congressman Roth who, unfortunately, is unable to attend today because of committee meetings in Washington. As most of you know, Bill is a member of the House Merchant Marine and Fisheries Commission and sits on the Fisheries and Wildlife Conservation Subcommittee, which earlier this year held extensive hearings on HR-25, popularly called the Estuarine Bill.

Delaware, because of its small size and proximity to the huge population and industrial concentrations of the Northeast, is confronted with especially great challenges in preserving and developing our estuaries. The rewards for successfully accomplishing this are many: More tourist trade from Philadelphia, Baltimore, Washington and beyond; improved recreational opportunities for Delawareans and people from neighboring states; better hunting and fishing for sportsmen; more jobs and increased prosperity for our people; and a more productive and beautiful state. The penalties for failure to reconcile the competing demands of man and his environment are, if anything, harsh in the extreme.

The National Estuarine Pollution Study called for by the Clean Water Restoration Act of 1966, the reason for this meeting, is a meaningful first step toward reclaiming the irreplaceable natural resources that are in our estuarine areas.

The Estuarine Bill passed by the House earlier this year and now pending before the Senate Commerce Subcommittee on Merchant Marine and Fisheries, represents a significant and needed extension of a far-reaching national effort, marshaling the resources of Federal, State and Local Governments, private organizations and individual citizens to reclaim, preserve and develop our nation's estuaries.

For too long Americans have taken for granted the beauty and bountifulness of our nation's greatest resources. Only in this century have we accepted and begun to act upon the realization that if future generations are to have these natural wonders to enjoy, we must adapt man to his environment now.

Moreover, it is only in the last decade or so that public awareness of the financial, social and other costs of water and air pollution has become widespread, and recent Congresses have been responsive to this serious and growing problem.

Your interest in coming to this meeting and the initiative of the Department of Interior's Federal Water Pollution Control Administration in holding it are indicative of high degree of public concern and the commitment of the people of Delaware working with the people of neighboring states and the Federal Government to deal effectively with this problem.

I know that Bill is disappointed at being unable to attend this morning, but I know, too, that he shares your interest and concern and is anxious to work with Delaware and Federal Pollution Control Agencies and private organizations to meet this challenge.

Thank you.

CHAIRMAN KLASHMAN: Thank you Very much, Mr. McDonald.

I should now like to call on Mayor Babiarz. Mayor, if I have mispronounced your name, please excuse a Bostonian.

HON. JOHN E. BABIARZ (Mayor, City of Wilmington): Thank you, Mr. Chairman.

I want to welcome you and the members of the panel and those who are attending the meeting here to the City of Wilmington, especially those who are visitors.

The City of Wilmington supports the National Estuarine Pollution Study for the following reasons: The work done to date by the Delaware River Basin Commission has essentially been restricted to the effect that water-borne domestic and industrial discharge into the river on the river itself. The results of this study combined with the planned usages of the river have been used to establish some very stringent water pollution control standards. It is essential that when the ultimate goals of these regulations are achieved, they are not wasted by ignoring other factors which affect the river.

Two, the study is also needed to determine the effect on the river of the inter-coastal and ocean-going vessels which navigate these waters. Many of these vessels have been long-time violators by pumping tanks, bilges, and their sanitary wastes overboard without treatment. Should a study of these reveal significant detrimental effects from these sources, a strong federal enforcement program should be initiated.

Three, Wilmington and other cities are planning and constructing water pollution control facilities which will benefit the lower river and bay. A study is needed to determine what conservation programs are necessary to preserve and improve the adjacent marshlands and other tidal water, wild life areas.

Thank you very much.

CHAIRMAN KLASHMAN: Thank you.

I should now like to call on Mr. Carmen Guarino from the City of Philadelphia, representing the City and Sam Baxter, Commissioner of Public Works.

MR. CARMEN F. GUARINO (Deputy Commissioner, Water Department, City of Philadelphia): To begin, Mr. Baxter is sorry he could not be here today. He had a very important engagement which he could not break.

As Mr. Klashman stated and for the record my name is Carmen F. Guarino. I am Deputy Commissioner of the City of Philadelphia Water Department. We are vitally interested in the Delaware Estuary since it is our water supply and it also receives the wastes from our water pollution control plants.

We would like to submit a statement within the specified time. We are not prepared today to do so.

Thank you.

CHAIRMAN KLASHMAN: Thank you very much, Mr. Guarino.

I should now like to call on Mr. John T. Carson, Jr., Director of the Division of Natural Resources, Bucks County, Pennsylvania.

MR. JOHN T. CARSON: Mr. Chairman, my name is John T. Carson, Jr., Director of Natural Resources for Bucks County, Pennsylvania. I am speaking today on behalf of the Commissioners of Bucks County regarding the impact of pollution on the waters of the tidal portions of the Delaware River.

I believe that Bucks County has a longer shore line on the tidal portion of the Delaware River than any other county in the Commonwealth of Pennsylvania. In fact, Bucks County's 23 miles from Morrisville to the mouth of the Poquessing Creek is 41 percent of the total Pennsylvania frontage. Therefore, we feel that we have as vital a stake in the future of this portion of the river as does anyone in the Commonwealth.

The water supply for Levittown, Bucks County, with a population of approximately 80,000, comes almost entirely from the Delaware Estuary, as does the supply for the Borough of Bristol and a portion of Bristol Township. Bensalem Township is supplied with water from the City of

Philadelphia's Torresdale plant, also located in the tidal estuary. In addition to the domestic and commercial users, industrial firms, such as Rohm & Haas and the Fairless plant of U.S. Steel, obtain their water from the Delaware Estuary.

While much of Bucks County's shore line has been permanently altered by deep dredging and piling the spoils on the river bank, there are still some unspoiled stretches of true estuarine habitat. Also, there is considerable recreational development of marinas, beaches and a new State Park in this reach of river. An extremely attractive apartment complex has been recently built adjacent to the river, taking full advantage of the view, breezes, and boating access.

The Delaware Estuary Comprehensive Study, which has been in progress for several years, has developed a tremendous amount of technical factual data about the present and probable future condition of these waters. There is no need to review this now familiar information here. However, two facts brought out in the study are rather startling: (1) The "overall removal of all waste discharges along the estuary is about 50 percent of the raw load"; and (2) "Overall, the total municipal and industrial waste load, prior to reduction, is expected to more than double by 1975."

Putting these two points together would seem to indicate that we would have to achieve an overall removal of better than 100 percent of the organic pollution load just in order to maintain the present quality. While this conclusion is not entirely justified, it does serve to emphasize the need for drastic and immediate action.

I think we all recognize that the Delaware Estuary must continue to serve a multitude of uses: Commercial navigation and recreational boating and swimming; water supply and municipal and industrial waste dilution and assimilation; and yet must still serve as a food base and habitat for fish, shellfish and other aquatic organisms. The key point in all this, however, is that no one use should be permitted to damage, reduce or eliminate the other equally important uses.

I would like to look for a moment at the basic structure of estuarine ecology. As a biologist, I see this as basic to the future existence of anything viable in this region.

In the Department of the Interior's publication, "Man, An Endangered Species?", is the statement, "Nowhere is man's battle to preserve and utilize his environment more important than in the nation's estuaries." I would add that nowhere is the problem more complex. An infinite variety of combinations of fresh and salt, and warm and cold water are being mixed and swirled together with the changing tides and currents. The only thing constant is change. As we add to the natural mix, man's contributions in the form of municipal and industrial waste discharge; silt particles from upstream farms and developments; insecticides and fertilizers from land runoff; heat from electric generating plants--we have a mix which is equaled nowhere else in nature.

The food chain on which the entire ecology of the Atlantic Coastal shelf is based has its origin in large part in the photosynthetic process carried on by the algae that form the greenish slime on the mud banks of our tidal flats. Here is where the nitrogen, phosphorus, carbon dioxide and water are put together to form the protein food which, through a long chain of small protozoa, crustaceans and other invertebrates, finally becomes the meat and energy of clams, oysters, fish and duck.

In turn, the excretions of these organisms, being broken down by bacteria, are wafted by the tides back to the algae factories to renew the cycle. Sunlight energy is really the only thing consumed in this intricately balanced cycle.

The complex is vast enough and varied enough to absorb tremendous shocks, which it surely has had. But it cannot take much more!

But you people don't need a lecture on estuarine ecology. Just keep in mind that 65 percent of all commercial fish harvested in the United States spend all or part of their lives in estuaries.

In short, I'm saying that some basic decisions on conflicting uses must be resolved. We now have enough technical knowledge to predict the probable outcome of various decisions. In my opinion, preserving the ecological habitat so that it is not completely destroyed takes priority over all other considerations. The organisms living in these waters are the purifiers and filtering systems which make it possible for us to exist adjacent to the estuary.

Beyond this we must weigh the needs of industry, recreation, water supply and waste disposal against the ecological background and against each other.

Since the fresh water streams and rivers contribute so much to the estuary in the form of fresh water, silt and pollution, it is essential to consider the entire drainage area in any planning for the estuary. I would suggest that serious consideration be given to developing a comprehensive land use plan for those portions of Pennsylvania, New Jersey and Delaware which border the estuary. Certainly there should be industrial development along the estuary, but the recreational potential is also tremendous. To lose one at the expense of the other would be very shortsighted.

So what is needed, I believe, is a plan which will encourage development in a manner planned to be compatible with other beneficial uses. Such a plan must, of course, provide for effective pollution control measures.

As to the agency capable of doing this planning, the Delaware River Basin Commission seems to be ideally suited for this gigantic undertaking. Certainly the states cannot do it by themselves. While the Commission, as a partnership of States and Federal Government, could bring together all levels of thinking to produce such a comprehensive land use plan or plan of development, if you will.

Thank you for your patience and for the opportunity to make this statement.

CHAIRMAN KLASHMAN: Thank you, Mr. Carson. Would you wait one moment to see if there are any questions?

Mr. Jensen, do you have any questions?

MR. JENSEN: You mentioned the need for a comprehensive land use plan. Do you have any ideas or thoughts on the problems of physical modification, dredging, filling, the other changes that may physically change the shape of the estuary? Should this be part of this comprehensive plan?

MR. CARSON: Very definitely in my estimation, yes. Land doesn't end at the banks of the river.

MR. HOWLETT: Mr. Carson, that was a very nice statement that you presented.

MR. CARSON: Thank you, Mr. Howlett.

MR. HOWLETT: I wonder if the Commissioners of Bucks County would go so far in proposing this thing if in the interests of time it was necessary financially support part of this study?

MR. CARSON: I think the financial support of Bucks County would be represented by the interests of the Commonwealth of Pennsylvania.

CHAIRMAN KLASHMAN: Mr. Bryson, do you have any questions?

MR. BRYSON: No.

CHAIRMAN KLASHMAN: Mr. Shaw?

MR. SHAW: No.

CHAIRMAN KLASHMAN: Mr. Luley?

MR. LULEY: No.

CHAIRMAN KLASHMAN: Thank you very much, Mr. Carson.

Mr. Howlett, is this proposal on the part of Mr. Carson tied in at all with the thoughts which the Commission has on regional planning?

MR. HOWLETT: The answer to that is yes, it is, but as my question might indicate, the timing of when it can be completed is of some concern, and the study of the scope that was suggested here will take some time and will take some money. We have already undertaken certain studies of land uses within the entire Delaware River Basin. They were basic data type of studies, and they would be the beginning of what Mr. Carson is asking for but not the end of what he is asking for. But they are certainly within our line of thinking.

CHAIRMAN KLASHMAN: Thank you very much.

Mr. Morris B. Smith, Vice Chairman, Water Resources Commission, Chemical Industry Council of New Jersey.

MR. MORRIS B. SMITH: Thank you, Mr. Klashman. Ladies and gentlemen:

My name is Morris B. Smith, and I am here to present the views of the Chemical Industry Councils of Delaware and New Jersey.

Each council is an organization representing the chemical manufacturers in their respective states. The chemical industry is an important contributor to the wealth of the Delaware Estuary and neighboring states. For example, in New Jersey, the state with the largest chemical industry in the country, we pay over one million dollars to employ 100,000 people in over 1100 establishments, producing about four billion dollars in products. As major users of water, both fresh and brackish, our companies are and have been concerned and active participants in water resources management. It is from this experience in the past, our problems of today and our planning and concern for the future, that we offer our comments.

Our main thesis is simple. The wise use of our total water resources, including estuarine and coastal zones, depends necessarily on, one, obtaining the facts and recognizing the fancy. Two, continually updating our knowledge. And, three, balancing these values to achieve a sound program. These must be emphasized to keep our goals continually in tune with reality. Our industry has publicly supported broad objectives to improve water quality where such improvements are necessary.

In the Delaware Basin and in the upper reaches of the estuary pollution control is a highly complex aspect of water resource management. We support water pollution control agencies in both of our states in their efforts to classify streams and establish water quality standards.

In this supporting role, the New Jersey Council, for example, has actively participated in all stream classification hearings held by the New Jersey Department of Health and the Delaware River Basin Commission bearing on the estuarian water quality standards. In addition, many of our individual member companies participated directly in these hearings as well as in the Advisory Committee of the Delaware Estuary Comprehensive Study of the Federal Water

Pollution Control Administration.

There are three circumstances which make the Delaware River Estuary especially worthy of consideration in formulating your report to Congress. They are, one, the heavy demands which have and will be placed on this water resource; two, the unique study which has been made of the pollution problem; and, three, the institutional arrangement which exists and is carrying out action programs.

The first circumstance I am sure you are aware of and can be documented most effectively by others.

The second circumstance, the Delaware Estuary Comprehensive Study, you are also well aware of, as it is the result of your own labors. However, let me mention a few points which are outstanding in our minds. The study was a federal undertaking at the request of local governmental agencies. It was carried out in a manner which evolved a real spirit of cooperation among those who are interested and who participated. Industry's contribution through use of manpower to gather data, review material submitted by study personnel, and to make suggestions, has been conservatively estimated at a quarter of a million dollars. The federal contribution has been well over a million dollars. The study began in 1961 and will hopefully have its final report released to the public this year--a time span of seven years.

A technical uniqueness of the study was the development and use of computerized mathematical models to simulate the effects of pollution control in the estuary under many given sets of conditions.

Finally, a serious attempt was made to estimate the economic balance at several levels of pollution control. As with most pioneering efforts, the mathematical models and economic balances, although only approximately accurate, were real steps forward and of great value. It should be understood, however, that the model merely represents a first approximation of the complex interrelationships actually existing in the total estuary, subject to our best present technical capabilities. Consequently, some of the projections based on the model may not in fact be achieved.

This major federal study of the estuary using advanced, although at present imperfect technical competence, gives us a wealth of historical data from which to work. Continuous effort is needed to keep the basic data current and the conclusions drawn therefrom timely.

The third circumstance, our existing institutional arrangement, the Delaware River Basin Commission, gives us the mechanism whereby the political realities of any control program can be evolved and implementing action taken. With almost seven years of functioning, the Commission is demonstrating its effectiveness in basin-wide water resources control.

We recommend that in your report to Congress this concept of basin-wide water management be stressed as the proper direction to take for estuarine as well as non-estuarine areas of any basin. That management should be regional to best reflect the needs and desires of the people who live in and use that basin.

It is not generally recognized and appreciated that the expected water quality improvements in the estuary may not be obtained or achieved as planned. While the very best technical knowledge available is being used, it may prove insufficient as a basis for forecasting the complexities and uncertainties encountered. Conversely, the current gloom about the probable availability of financial aid for the public projects involved is widely recognized. The harsh realities of relative priorities among the various demands placed on government and its resources may cause delay, hopefully of only a temporary nature.

In conclusion, we wish to reiterate the fact that the upper Delaware Estuary has been and will continue to be a complex urban area. The population will grow. Jobs must be provided for many more people. Thus commerce and industry, including the chemical industry, must also grow. It is in this area that the principal value of the upper Delaware Estuary area lies.

On the other hand, in the bay portion of the estuary, by tradition and probably by needs and desires of the people in the basin, the principal values are fishing, shellfishing, wild life propagation, recreation, and allied uses. By careful management of the heavy demands which we place on this water resource, the growth of all of these values can be maintained.

CHAIRMAN KLASHMAN: Thank you, Mr. Smith. Would you wait just a moment.

Mr. Jensen, do you have any questions?

MR. JENSEN: You have spoken about the need for applying a regional concept, regional management concepts, for water quality. Do you think that this same regional concept should apply for, as Mr. Carson suggested, development of a broad use plan?

MR. SMITH: Yes. Integration of multiple uses can only be accomplished through a single agency.

MR. JENSEN: This would be land use as well as water use?

MR. SMITH: Well, the Council has not studied it through the implications of land use completely. It would appear that this would be a necessary accompaniment.

MR. JENSEN: In terms of the estuarian studies, this is about the twelfth of these state meetings that we have held. In almost every one of them thus far several of the speakers have pointed to the need for the development of regional land use plans as a necessary adjunct to the long-term management of this estuarine resource. I think what I am asking here is, do you believe that this same regional approach then should be used for land planning and for physical modification as you have suggested for water quality?

MR. SMITH: I cannot see how it can be avoided, sir.

MR. JENSEN: How could such a plan be developed? How would one go about this?

MR. SMITH: I am not prepared to answer this completely. As I say, the implications with regard to regional land development has not been explored fully by the Council, and I would prefer not to make any additional comments at the present time on this.

MR. JENSEN: Well, what do you think might be the best course of action then to get the ideas of the Council? Would they like to consider this sort of a problem?

MR. SMITH: Yes; I think since it will influence industrial development on the land regions surrounding our estuaries, inevitably they will be involved and therefore will be considering this.

MR. JENSEN: So that the same general approach then might over the long term be taken that you have taken in the past with water quality?

MR. SMITH: Yes, precisely.

MR. JENSEN: Thank you very much.

CHAIRMAN KLASHMAN: Mr. Bryson?

MR. BRYSON: You mentioned that certain projections would not be met or could not be met. I assume you are talking about the water quality goals. Which particular goals do you feel cannot be met and why?

MR. SMITH: Sir, I think if you will read the statement, the statement was not that they will not be met but that they may not be met, and this is simply an estimate based upon the areas of uncertainty and the incompleteness insofar as the background information. We are dealing with areas of probability rather than certainty here, and there are certain ecological factors which have not been completely defined as yet, the whole role of algal growth that the previous speaker referred to, the question of eutrophication, not in its complete sense, as it applies to lakes, what effect removal of certain ingredients from the aquatic environment will have on the end result is an estimate rather than a certainty, and it is in this sense that we are simply raising the prospect that goals which have been defined on the basis of the information available, that the setting of the goals might not be achievable simply by accomplishment of the aspects of a specific program.

It is in this sense that we have indicated the need for dynamics for a re-evaluation, continual re-evaluation, based upon the accumulation of additional information, additional data.

MR. BRYSON: I certainly agree with you that we need more studies--

MR. SMITH: Continuing studies, sir.

MR. BRYSON: I hope if you can be more specific--and if you don't care to at this time, would you do it later for the benefit of those who have to guide such programs and be more specific as to exactly the point you are trying to approach. I think it is important if we want to reach these goals for you to state not generalities but to a specific point.

MR. SMITH: Again I will emphasize that we are not stating that goals will not be reached. We are simply drawing attention to the fact that these goals may not be reached because of the uncertainties that associate with the basic information upon which achievement of objectives was based and formulated.

At the bottom of Page 2 the statement is that the expected water quality improvements in theestuary may not be obtained as planned. It is not that they will not be obtained as planned.

CHAIRMAN KLASHMAN: Mr. Shaw, do you have any questions?

MR. SHAW: No.

CHAIRMAN KLASHMAN: Mr. Luley?

MR. LULEY: No, I haven't.

CHAIRMAN KLASHMAN: Mr. Howlett?

MR. HOWLETT: No.

CHAIRMAN KLASHMAN: Thank you very much, Mr. Smith.

I should now like to call on Mrs. R. J. Kallal, Delaware Delegate to the League of Women Voters.

MRS. R. J. KALLAL: I am Mrs. Robert Kallal of Wilmington, Delaware, representing the Interleague Council of the Delaware, which is made up of the League of Women Voters of Delaware, New Jersey, New York and Pennsylvania.

The Interleague Council was formed in 1958, and it represents 23,000 league members in the Delaware River service area. One of its first undertakings was the study of and subsequently support for the compact which established the Delaware River Basin Commission.

As a citizens group, known to be interested in long-range planning for water resources development, and as a group organized on a basin-wide basis, the Interleague Council was asked to participate in the activities of the Water Use Advisory Committee of the Delaware Estuary Study in 1961 to 1966. In order that an Interleague Council representative might take part in the deliberations of this committee, members from a number of local leagues in the basin were consulted on what they believed were reasonable and desirable uses for various sections of the Delaware Estuary.

Speaking in broad terms, league members believe that present uses of the estuary should be continued and enhanced, including navigation, pleasure boating, sport and commercial fishing, swimming, protection of wild life, industrial water supply, and carefully regulated waste disposal.

The League feels it is important to stress the need for water based recreation and would like to see water in the estuary of sufficiently high quality that swimming and boating couldbe enjoyed, at least below Liston Point, but hopefully even above that point closer to the more densely populated areas. With the increasing amount of leisure time for all citizens, is it not sensible to plan for more attractive waterfront areas for active and passive recreation?

At the D.R.B.C. hearing on Water Quality for the Delaware River Basin, the Interleague Council of the Delaware testified in support of objective set 2. It was our belief then, and it is now, that the highest standard technically possible and financially feasible should be our ultimate goal.

We believe the public is willing to pay for pollution abatement and the upgrading of our environment if properly informed of the undesirable alternatives and lead by reasonable men and women. The emphasis should be on the kind of environment we want for ourselves and for our future generations.

Thank you.

CHAIRMAN KLASHMAN: Thank you very much, Mrs. Kallal.

MRS. KALLAL: Any questions?

MR. JENSEN: Just one question about the League's position or the League's past interest in the development of a comprehensive land use plan, such as Mr. Carson has suggested. Has this been discussed?

MRS. KALLAL: This has not been a study on a national basis. We have favored planning which would be reasonable in nature, yes. I can state that in a general sort of way.

Does that answer it or not?

MR. JENSEN: Thank you.

CHAIRMAN KLASHMAN: Mr. Bryson, do you have any questions?

MR. BRYSON: Not a question but thank you very much for your statement, and we would like to have your continued cooperation in the study and want to thank you for your past efforts.

MRS. KALLAL: Thank you.

CHAIRMAN KLASHMAN: Mr. Shaw?

MR. SHAW: I would like to add to that that we in New Jersey have always appreciated the cooperation and support of the League.

MRS. KALLAL: Thank you.

CHAIRMAN KLASHMAN: Mr. Luley?

MR. LULEY: No.

CHAIRMAN KLASHMAN: Mr. Howlett?

MR. HOWLETT: Yes, I have a question. I, too, like the League, but I have a question on it.

MRS. KALLAL: That is all right.

MR. HOWLETT: I wonder if the League has ever made a study of this matter of land zoning or zoning of private property and, if so, what position it may have taken in regard to at what level of government it would see this desirable objective.

MRS. KALLAL: We study things on three levels as we have three levels of government. We have on the local area studied planning and zoning, yes, and of local positions.

We have also in our study of the Delaware favored considering regions individually, but we don't have any--possibly one of my colleagues can answer this better than I--but we don't have any position that I know of as to whether the planning should be done, I assume you mean on state, national or local level--is this it?

MR. HOWLETT: Yes, that was the question.

MRS. KALLAL: No, we don't, except that we support the concept of the D.R.B.C. of cooperation between the states. That is about as far as I can go.

MR. HOWLETT: Thank you.

CHAIRMAN KLASHMAN: Again we thank you and the 25,000 members of the League in this area.

I would like again to ask that if any of you have prepared statements and you do not have copies, if you would let the secretary at the entrance to this room borrow your copy just briefly, we would like to make some Xerox copies before you make your statement, if this is possible.

I should now like to call on Mr. Ralph L. Dodge, Executive Vice President, Upper Chesapeake Watershed Association, Inc.

MR. RALPH L. DODGE: Mr. Klashman, ladies and gentlemen:

You have heard my position. I want to apologize and explain first briefly why an outsider like myself should be crashing a meeting of the Middle Atlantic Division of the Water Pollution Control Administration which represents the Northeast section of the country, four states here, and the subject of my short paper today will be the Upper Chesapeake Bay, which is not even in the region. But there are three reasons for doing that.

The donors and members of our association, most of them live in the State of Delaware permanently and get their recreation on the waters of the Upper Chesapeake Bay, perhaps in part because of the present condition of the Delaware Bay, which is the subject of today's talks.

The second reason is that most of the recreational users of those waters come not from Maryland but from Pennsylvania, Delaware, New York and New Jersey, for perhaps the same reason.

And, thirdly, the proposed pilot project which I will discuss briefly this morning may be of interest to private organizations in the Northeastern Region of the Federal Water Pollution Control and perhaps might in part be modified or copied by them. It is intended to be a contribution, controlled contribution, to the Federal Water Pollution Control Administration's excellent work that is now going on.

I will read the short paper.

The Upper Chesapeake Watershed Association, Inc., "UCWA", established in 1950, is a non-profit association of 178 residents and property owners of Cecil, Harford and Kent Counties of Maryland. Its primary aim is to encourage conservation and beneficial use of the natural resources of the watershed.

The UCWA, with the help and approval of the Federal Water Pollution Control Administration, the Maryland Department of Water Resources, the Maryland Department of Chesapeake Bay Affairs, the Maryland Department of Health, the Maryland Natural Resources Institute, and the Chesapeake Bay Institute, has completed plans for a pilot project to assemble available data, both published and unpublished, on the water quality, (chemical, physical, bacteriological and biological) of six estuaries of the Upper Chesapeake Bay. The Wye Institute of Cheston-on-Wye, Queenstown, Maryland, has agreed to share the costs of this pilot project with the UCWA.

The Wye Institute is a non-profit organization chartered by the State of Maryland in 1963 to work with the people and institutions of the nine counties of the Eastern

Shore of Maryland in their efforts to strengthen and expand educational, cultural and economic opportunities.

The six estuaries to be includedin this project are: (1) the Susquehanna River, from Conowingo Dam to the mouth; (2) Furnace Bay; (3) the North East River, from the Town of North East to the mouth; (4) the Elk River, from Route 40 to Turkey Point, including the C & D Canal from the Maryland-Delaware line to Welch Point; (5) the Bohemia River from "fresh" (as the biologists or ecologists call it) to Town Point; and (6) the Sassafras River, from "fresh" to Grove Point.

The literature and files of state, federal, county, municipal, and private agencies that have worked in this field will be diligently searched for records of water quality measurements of the past.

I will depart from the text for a moment to say that Mr. Smith's very apt phrase, to obtain the facts and recognizing the fancy in present water quality opinions, is pertinent here. We hope to dig the facts out of the hidden records.

To come back to the text now, the search will be made under contract with the Academy of Natural Sciences of Philadelphia. Scientists from the staff of Dr. Ruth Patrick, Chairman of the Limnology Department of the Academy, will collect the data and transpose them into the form required for storage in the Federal Water Pollution Control Administration's (FWPCA) "STORET" system. This is a trade name. The STORET is a system of using electronic computers for the storage and retrieval of data for water quality control.

When the search has been completed, Dr. Patrick will prepare a report written in laymen's terms that will present the relative condition of specified sections of the six estuaries. Particular attention will be called to the indications from past measurements as to the relative degree of pollution at specific locations. Significant trends in water quality data taken over periods of time will also be displayed. Those sections where reliable information about water quality is lacking will be clearly indicated.

Dr. Patrick's report will aid in showing the future actions that will be needed if Cecil County's estuaries are to be made or kept suitable for the uses designated in our Maryland Water Quality Standards.

If the results of this first part of the pilot project seem to warrant it, the work will be continued on the waters of Cecil County's fresh water streams (Big Elk Creek, Principio Creek, Octoraro Creek, Bohemia River, above "fresh", and Sassafras River, above "fresh").

If this project works out as well as we believe it will, other citizens' groups interested in the waters of Chesapeake Bay can contribute in a like manner. Such information is not now readily available. If assembled in usable form it will serve the needs of the many state, county, municipal and private agencies working in the fields of water quality control, industrial plant location, or sanitary engineering.

CHAIRMAN KLASHMAN: Thank you, Mr. Dodge. Mr. Jensen, do you have any questions?

MR. JENSEN: I have no questions.

CHAIRMAN KLASHMAN: Mr. Bryson?

MR. BRYSON: No.

CHAIRMAN KLASHMAN: Mr. Shaw?

MR. SHAW: No.

CHAIRMAN KLASHMAN: Mr. Luley?

MR. LULEY: No.

CHAIRMAN KLASHMAN: Mr. Howlett?

MR. HOWLETT: I didn't get at the opening of your remarks whether you are a professional man or are presenting this on behalf of a professional group.

MR. DODGE: I am presenting it as Executive Vice President of the Upper Chesapeake Watershed Association, a citizens organization, as it is stated, interested in encouraging conservation and beneficial use of the natural resources of that watershed.

MR. HOWLETT: I have some interest in some biological overtones. Are you a biologist?

MR. DODGE: No. I am a chemist--an ex-chemist; put it that way.

MR. HOWLETT: Thank you.

CHAIRMAN KLASHMAN: Thank you very much, Mr. Dodge. We would now like to call on Mr. W. H. Roach,

MR. W. H. ROACH: Mr. Klashman, members of the committee:

My name is W. H. Roach and I appear here today on behalf of the Industrial Subcommittee of the Technical Advisory Committee (TAC) of the Delaware Estuary Comprehensive Study (DECS)-Federal Water Pollution Control Administration. On our Subcommittee are representatives of 44 industrial companies with plants located on or near the estuary and dependent on it for water supply or waste disposal or both. We wish to express our views on the problems and opportunities you have in dealing with water quality management in the estuarine areas of our country. First of all, however, we wish to commend FWPCA for searching out the views of all who have a concern for the use of our estuaries. These are, perhaps, among the least understood of our many national resources.

As you know, our Subcommittee was formed by DECS over four years ago to participate in providing technical assistance to the federal study of water quality problems in the upper portion of the Delaware Estuary. The TAC itself contained, in addition, representation from the technical staffs of the Delaware River Basin Commission, the pollution control agencies of Delaware, New Jersey and Pennsylvania, the City of Philadelphia as well as from such federal agencies as the Bureau of Outdoor Recreation and the Fish and Wildlife Service. DECS also established a Water Use Advisory Committee to obtain indications of and specific recommendations on the needs and desires of a broad cross-section of the people in this area on what water quality is needed for various water uses. That committee, incidentally, was set up by DECS with representation from about 90 groups. There were 11 groups on the Recreation, Conservation, Fish and Wildlife Subcommittee, 17 on the General Public Subcommittee, 21 on the Local Governments and Planning Agencies Subcommittee, and 41 industrial companies and associations representing 8 broad categories of products manufacture on the Industry Subcommittee. The Water Use Subcommittees were asked to find out from their member organizations what uses, needs and objectives they sought for the waters of the estuary. These organizations had to state what uses they now make of the waters and what they hope to make in the future. They were asked to state, qualitatively, how water quality affects these uses and then, quantitatively, what levels of various water quality indicators would be needed to attain these uses and, hopefully, what could be feasibly attained.

Both the TAC and WUAC industrial subcommittees worked with DECS in obtaining cooperation with industrial plants in developing such information as waste loadings, waste reduction cost data, estimates of the effects of improved water quality on industry and gave several suggestions on the technical aspects of the DECS program. For example, our Industrial Subcommittees proposed, during the DECS work, that economic comparisons of costs and benefits for water quality improvement programs should consider, not only capital costs, but also operating and maintenance costs. We assisted DECS in getting such information from industrial plants along the estuary. Another concept we suggested was that of uniform treatment by zones in the estuary.

We engaged Dr. D. J. O'Connor of Manhattan College, an internationally recognized expert on pollution of estuaries, to make an independent review of the DECS mathematical approach to gain better understanding of its findings on the part of the estuary. While he agreed that the basic mathematical model of DECS was valid, there were still many unknowns about the technical aspects of pollution in the Delaware. O'Connor concluded, for example, that the existing zone of active nitrification in the Delaware might shift after future waste treatment steps. This could significantly alter the dissolved oxygen pattern expected. For your further information, I attach to my statement a copy of Dr. O'Connor's report.

CHAIRMAN KLASHMAN: Mr. Roach, the copy of Dr. O'Connor's report will be placed in our files and used by the group that is preparing the report, but we will not include it in this writing.

MR. ROACH: That is satisfactory.

CHAIRMAN KLASHMAN: It will be attached as an exhibit.

MR. ROACH: That is satisfactory, yes.

Our TAC continues to work with DECS in the carrying out of its program and we are, even now, providing an avenue whereby the final DECS report can be discussed from a technical viewpoint before final issue.

I have dwelt at length on the roles and functions of advisory groups in the conduct of the DECS program. I have done this because such advisory groups have played a significant and useful role in helping DECS develop a factual understanding of many of the water quality problems and their solution in the Delaware. We believe that this was the first such intimate large-scale association of the many members of the water users community with those responsible for seeking and developing the technical solutions to estuarine water quality management programs.

We urge that, in its final report to Congress of the National Estuarine Pollution Study, FWPCA include a section on how to sound out the views and opinions of the users of those estuaries receiving individual study. We suggest that the advisory committee concept of the DECS program be recommended as the basic pattern for seeking such views and opinions. After all, no two estuaries are alike, not only in their physical. chemical and biological structure, but each is different from the standpoint of usage by man. Each estuary contributes to our national resources in a unique way. Some contribute most by acting as recreational resources, some by acting as fisheries resources, while still others by providing the broad backbone of large, complex urban areas with large populations dependent on the commerce and industry that grew up on those particular estuaries.

In the Guidelines for this meeting, you sought views and positions on specific types of questions. While our Subcommittee is not in a position to comment in detail on any of these, we wish to speak in general terms about some.

1. Values of an Estuary: As we pointed out earlier, each estuary is unique as a national resource. Putting this another way, the distribution of its values among aesthetic, recreational, fisheries, wildlife development, commercial or industrial usage varies tremendously. Some of those usages are well established, some are in process of development, while still others await the future. To try to place a value on each usage for any estuary without detailed study would be the height of misguidance, not only to political leaders but to the public.

Turning to the Delaware, we can see how that distribution of usage values varies as we proceed downriver from Trenton to the sea. The upper reaches, for example, are beyond the reach of salt water intrusion except during the severest droughts. Thus, public water supply, either by direct intake or by natural recharge of groundwater, is a highly significant use. On the other hand, the summertime saltiness in the stretch from Philadelphia to the Chesapeake and Delaware Canal does not prevent commercial and industrial use from contributing to the health and well-being of about 4.5 million people. The population is expected to double within the next five decades. The productivity of the upper estuary, according to DRBC figures, is expected to grow five times in the 50-year period, from the year 1960 to 2010.

It is obvious to a traveler in this stretch of the estuary that commercial and industrial use is the most significant here. It is important to recognize that the present and future values and uses of estuaries are determined by past development. The upper Delaware Estuary has grown because of its attractiveness to people and commerce. To try to change that pattern of development to conform to new uses requiring very costly changes in water quality should be given careful and searching thought. For example, the upper estuary does not provide extensive bathing facilities. Bathing and swimming are not done, not primarily because of water quality, but because significantfacilities along the shores to serve the population involved do not exist, nor are likely to be created.

Below the canal stretch the large tidal marshes on both sides of the estuary. Here the values are not well established, nor even well understood. We know that many commercially significant fisheries depend on these marshes. The aesthetic enjoyment of these unique marshes is highly significant. The shellfisheries industry is in this portion of the estuary.

The above is but the briefest of looks at the many uses of the Delaware Estuary. But it is obvious that the distribution of uses is unique--it cannot be applied to any other estuary. Thus, we recommend that this sense of uniqueness of each individual estuary be highlighted in your report to Congress and your reports to the public.

2. Damage by Pollution: The Sport Fishing Institute, in its Bulletin of January-February, 1968, defines pollution as the impairment of water quality to a degree that adversely affects any beneficial use. In other words, if a desired use is not impaired, pollution does not exist. This concept was also touched upon by President Johnson in his Conservation message to Congress, March 8, 1968. In a section on pollution problems andwater quality standards, he stated:

> "Water quality standards must be set for entire bodies of water, varying from place to place depending on the water's use."

The Delaware River Basin Commission used essentially the same idea in its Regulations adopted last March and approved by the Secretary of the Interior. It established that assimilative capacities for various water quality parameters be allocated among dischargers when necessary. This idea of what constitutes pollution should be included as a basic cornerstone of your report to Congress.

How to use our estuaries and minimize pollution, in the above sense, will require large expenditures of public funds. This was shown by the DECS group in their work. They also answered, to a degree, the question you raise on the damage by pollution. They did this by stating the benefits to be gained from raising water quality levels, dissolved oxygen in particular. In their preliminary report, they found that the value of benefits was relatively insensitive to water quality improvement once a fairly small improvement was made. For example, for the four improvement sets of water quality objectives, the benefits increased about 30 percent from the lowest to the highest set. On the other hand, costs to accomplish the water quality improvement rose almost 500 percent from the lowest to highest improvement set.

These figures are from the DECS preliminary report of 1966. While we understand that new figures have been developed, showing higher costs as well as benefits, the decision on the water quality criteria adopted was made at the time when the stated costs exceeded benefits.

We urge, in your report to Congress, that you acquaint the legislators with the problem of costs, in some cases, exceeding benefits in unnecessarily raising water quality of highly urbanized estuaries such as the upper Delaware.

We wish, also, to sound a note of warning, however, on improvement of water quality in the Delaware Estuary.

The Delaware River Basin Commission and the States of Delaware, New Jersey and Pennsylvania are embarking on a program of water quality improvement on a scale never before tried in one geographic area. The timetable envisioned today will not be the one we look at tomorrow. Events in the world far beyond the shores of the Delaware will affect that timetable. Even as the program progresses, water quality improvement will be slow.

There are many unknown factors of a technical nature which could adversely affect the results expected. For these reasons then, you must not lead Congress and the general public to expect rapid and miraculous improvement. No vast recreational areas will open up along the river between Philadelphia and Wilmington which is where most of the people are. This is an urban, commercial and industrial area. Its use pattern is set. Therefore, from a technical point of view, so is its water quality pattern. To drastically change that pattern would really mean moving the people away and relocating the commerce and industry. This is not likely to happen. So, for this reason, it would be the height of misguidance and cruelty to lead the public to expect something from present water quality improvement programs which is not likely to materialize.

3. System of Management: As pointed out earlier,

the Delaware is a multi-use estuary, varying from place to place. To set one use paramount at all times and places would be highly undesirable. Somehow, you must first find out how and where the many uses are, and how they can be protected and nourished. Some uses impinge on one another and you must define the boundaries of infringement. Decisions are then needed on how these uses can be accommodated or preserved. This is the task of the system of management. Obviously, the system must include a close relationship between managers and users. And since the spectrum of users varies widely among estuaries, the systems of management should, perhaps, also vary widely. From the pollution point of view, this will depend also on the location of the estuary. Some are wholly intrastate, other interstate. Here on the Delaware, our system of water quality management consists of a State-Federal partnership. Other estuaries need only State control, as for example, along portions of the coastal areas of New Jersey and Delaware.

But regardless of the system of management adopted, one of the fundamental requirements for all estuaries is this: Management must be based on facts. Facts, unfortunately, are not always available. A case in point exists here on the Delaware. The upper portion of the estuary has been well studied by DECS. Obviously, we do not know all the technical factors and economic forces in the detail we wish. But DECS has made considerable strides in the proper direction. The Delaware Bay, on the other hand, is not as well known from the water quality and water uses viewpoint. The DECS group has plans to study the Bay in a manner similar to the way the upper estuary was studied. We understand that this study has not been funded sufficiently to be fruitful. We recommend that such fundings be provided.

In conclusion, our Subcommittee wishes to re-emphasize several points.

1. In managing estuarine water quality, the need to recognize all uses and patterns of uses is essential. No two estuaries are alike or are used alike.

2. For all estuaries, and particularly for complex, intensely used estuaries, formation and use of advisory groups of water users offers an excellent opportunity to seek out the needs and desires of the area people.

3. Technical and economic facts are needed before any estuarine water quality management program can be effectively carried out. The management program should be in conformity with the facts, not the fantasies, of the situation.

4. Estuaries are national resources that must be protected for the maximum benefits that can be derived, whether they be creative of wealth for large urban populations or

places of beauty where the chief value is aesthetic enjoyment.

5. Water quality improvement programs for large urbanized estuaries such as the Delaware will be slow to produce results. Care must be exercised not to promise results which, because of factors little understood or insufficiently studied, will not materialize. It is better to promise stepwise improvement with constant reassessment of position, than miraculous abundance of fishes and recreation once the stated program is completed.

For your information, we are attaching hereto a copy of all statements made by the Industrial Subcommittees of the Delaware Estuary Comprehensive Study at all hearings on the water quality standards and regulations pertaining to the Delaware Estuary that have been held within the past two years by the Delaware River Basin Commission, the State of Delaware and the Commonwealth of Pennsylvania.

CHAIRMAN KLASHMAN: Mr. Roach, these statements againwill be included as exhibits.

MR. ROACH: Yes, sir. Thank you. That was the purpose of them, for your guidance, not the reproduction.

CHAIRMAN KLASHMAN: Thank you very much. Mr. Jensen?

MR. JENSEN: At one place in your paper you sort of suggest that recreational areas are not needed in urban

ENDORSEMENT

(Mr. Roach's Statement)

The statement before the public meeting on the National Estuarine Pollution Study, June 27, 1968, in Wilmington, Delaware on behalf of the Industrial Subcommittee, Technical Advisory Committee, Delaware Estuary Comprehensive Study, is endorsed by the following members of that Subcommittee:

Allied Chemical Corporation
Atlantic City Electric Company
Atlantic Richfield Company
Atlas Chemical Industries, Inc.
Avisun Corporation
Campbell Soup Corporation
Delmarvo Power and Light Company
E. I. duPont de Nemours Company
FMC Corporation - American Viscose Division
General Aniline and Film Corporation
Getty Oil Company
Gulf Oil Corporation
Hercules, Inc.
Mobile Oil Corporation
Monsanto Company
New Jersey Zinc Company
Patterson Parchment Paper Company
Pennsylvania Industrial Chemical Company
Pennsylvania Manufacturers Association
Philadelphia Electric Company
Publicker Industries, Inc.
Radio Corporation of America
Rohm and Haas Company
Scott Paper Company
Sinclair Refining Company
Sun Oil Company
Texaco Inc.
United States Steel Corporation
Westinghouse Electric Corporation

areas. As a resident of a large urban area I am not sure I quite agree.

MR. ROACH: Well, we were specifically speaking of the industrial urban complex from Philadelphia to Wilmington where the riverbanks are pretty well taken up by industrial establishments and there is less room or facilities there, nor do they think it will be developed, for recreation along those stretches of the estuary. We don't mean to imply that estuaries cannot be used for recreation where facilities are available or could be made available, but in this particular industrial area and shipping area we think that recreational benefits are not apt to materialize.

MR. JENSEN: You have mentioned the desirability of establishing advisory groups for water uses. Would you think that it might also be advantageous to establish advisory groups for land uses?

MR. ROACH: Oh, I think that they have to go hand in hand, yes, sir. It was not done in this area because I believe that the land use is pretty well established along this particular stretch of the estuary, of this entire estuary, but certainly in the development of future water quality management programs on estuaries where land has to be programmed, land use has to be programmed as well. Yes, I should think that would be a very vital part of your entire study and your entire program.

MR. JENSEN: Thank you.

CHAIRMAN KLASHMAN: Mr. Bryson?

MR. BRYSON: No.

CHAIRMAN KLASHMAN: Mr. Shaw?

MR. SHAW: No.

CHAIRMAN KLASHMAN: Mr. Luley?

MR. LULEY: No.

CHAIRMAN KLASHMAN: Mr. Howlett?

MR. HOWLETT: Mr. Roach, I, too, wanted to pick up your point on the possibility of use or development of recreation in the future. My understanding of that is--and I have seen the plans which the City of Philadelphia itself has for waterfront development for recreational purposes. As spokesman for the Industrial Subcommittee, I wonder if for the record you would mind answering a few questions beyond the scope of your paper, but I will limit them--

MR. ROACH: I trust you will, sir.

MR. HOWLETT: In your judgment do modern waste treatment facilities, when properly operated, remove all traces of petroleum from waste water?

MR. ROACH: Yes, sir. A well-designed plant would--you are speaking now of hydrocarbons included in the water--a well-designed treatment plant properly operated would reduce the hydrocarbon content down in the order of very few parts per million.

MR. HOWLETT: Enough to reduce a film?

MR. ROACH: Oh, yes.

MR. HOWLETT: We have heard a lot lately about facilities locally for recapturing accidental spills of oil. Again speaking for the industry, not just your own facility, Mr. Roach, do you know whether most of the refineries that presently exist in this estuary are equipped with facilities to first lock in oil that might be accidentally spilled and then mop it up?

MR. ROACH: Yes, sir, I would say thatmost of us are equipped to handle spills of the ordinary type that might occur. You understand, of course, that in general a spill would not become a major one at a refinery unless something really was of a catastrophic set of conditions. You can have minor spills that could be easily contained. The oil refineries are all prepared to contain such spills at their own docks and areas there and to contain such spills as may occur on land to prevent them from reaching in the river, and I think I can say, without giving away any State secrets among the oil industry, we have a cooperative committee working with the Coast Guard on cooperative efforts to work for large scale spills or what we would include unattached spills. Occasionally there is oil on the river that is not traceable to any refinery or terminal operation but may come from the pumping of a bilge tank, leaky barge, or something like that, and the Coast Guard, I understand, is taking steps to become the initiating agency to ask for help in cleaning up such spills.

But there is a large movement in all areas of coastal and estuarian waters for the Coast Guard to be the initiating agency in asking for the cooperation of oil companies and shipping companies to assist in that.

There is a program in the harbor of Portland, Maine. There is one, I believe, in Massachusetts. There is one out in Hawaii. I understand the San Francisco Bay is being studied along these lines of maintaining spills and not just letting them get away.

Now, in all justification, without being too lengthy, I would like to point out that in the estuary we have a considerable problem because of the fairly rapid current movement of water with the incoming and outgoing tides, and the fact that we have the wind which causes the water to be choppy, it is not a simple matter to go out and surround a small spill and pick it up. Speed is of the essence, and it takes a lot of work and a lot of things, but we hope to work out a program in conjunction with the Coast Guard in all probability to do all we can to pick up oil that is spilled regardless of its source.

MR. HOWLETT: Thank you very much.

CHAIRMAN KLASHMAN: Mr. Roach, to amplify your statement about the work at Portland and Boston, all of our FWPCA regional offices are in the process of establishing contingency plans for containing oil spills on all major estuarian waters.

You talked in your statement about the water uses and about the utilization of the assimilative capacity of the stream. Is it your view that the full assimilative capacity of the stream should be allocated?

MR. ROACH: Well, no, sir, I don't think so. It is like a savings account. You shouldn't draw it down to nothing. I think that some reserve should be there for future expansion. I think that we have to provide for other industries may be coming into the area; a plant wants to expand a little bit, if he is already up to the limits of his treatment of the known technology at that time.

I think that the concept of a reserve assimilative capacity in an area such as the Delaware Basin Commission established for the estuary is feasible. I may not agree with all the figures, but I think the concept is quite feasible.

CHAIRMAN KLASHMAN: Thank you very much.

Mrs. Eleanor M. Webster, Conservation Foundation, Philadelphia.

MRS. ELEANOR M. WEBSTER: Mr. Chairman, members of the panel:

I would like to address myself first to the five points which you made, Mr. Klashman, this morning and then to explain briefly what the Conservation Foundation is doing in the Delaware River Estuary.

First, what do you think is the value of the estuary? The Conservation Foundation several years ago got Dr. Lionel Walker, who is the Director of the Marine Laboratory of the Department of the Interior, Fish and Wildlife Service at Sandy Hook, to begin a study of the Atlantic Estuarian Zone. This study is overwhelmingly showing that the great value of the Atlantic Estuarian Zone is its continuity, and its continuity is essential to the preservation of the major commercial fishing species.

It is a fallacy that the ocean is the area which has the great productivity. The shallow estuarian zone is the area which has the productivity of marine resources. Whether or not this region is damaged--it is now damaged; the question is how badly is it damaged and whether or not we can restore it.

Secondly, what is its future? Its future depends very heavily on the relationship of the different Federal, State and Local Governments and how they use the information available. Over and over again throughout the eastern seacoast we found that when you really got down to it, scientists did have some pretty good ideas of what was happening, but the degree between the implementation of what they have learned and the actual practice is too great.

Fourth, what are the best uses of the estuarian zone? Certainly the major use and criterion which we would recommend is that the burden of proof for the destruction of the natural productivity of the estuarian zone be placed upon the person or activity which would destroy such productivity.

Finally, what sort of a management system? Certainly a comprehensive land use design is important, but a land use plan which is ignored is of little value. We would recommend that there be some way that government would implement the plan and have the authority to do so.

Next we think that there needs to be a stronger assertion of federal jurisdiction. In the Tideland Oil cases the government asserted that the government did have jurisdiction over this area, only to have the Submerged Land Acts of 1952 give the jurisdiction of the area back to the states. In a sense I think the Federal Government needs to say, "This is what we feel now is important," and it is important for the entire country, not just the states bordering on the estuarian zone.

Finally, I would like to discuss what the Conservation Foundation is doing in the estuarian zone. The Foundation believes very strongly that there is going to be continued development, industrial, residential, in the estuarian zone. Therefore we have to have ways to preserve and protect the productivity and the continuity of the zone while allowing for this development, for an ever-increasing population.

Therefore we have chosen approximately a thousand-acre marsh outside Philadelphia, the Tinicum Marsn in Delaware County, and are studying it first to determine how badly damaged the marsh area is. These studies are being done by the Academy of Natural Sciences in Philadelphia.

Secondly, we are trying to determine the local attitudes and work with the local people to make them realize the value of estuarian areas. At present a lot of people simply have no feeling whatsoever or just have a real distaste for the marsh because they view it as something which breathes mosquitoes and rats.

Finally we are trying to analyze the industrial and the governmental pressures against preservation and trying to see if there is a way that a plan can be worked out which will preserve and renew the productivity of this thousand-acre marsh, at the same time allowing for certain development to create the desperately needed tax base that these local communities demand.

This program is in its preliminary stages, and I think will offer new directions in a positive manner for other groups who may seek to preserve the continuity of the estuarian zone.

CHAIRMAN KLASHMAN: Thank you very much, Mrs. Webster. Mr. Jensen?

MR. JENSEN: You mentioned that there needed to be a strong government role in the development and application of a land use plan. Do you have any specific suggestions on that?

MRS. WEBSTER: Well, not at the moment, but I certainly think, just from your own booklet, there are 18 federal agencies involved in the estuarian zone. There are 10 commissions for regional commissions. There are innumerable state agencies and local agencies. The result is that too frequently there is no action because there is no agency that is willing to accept the responsibility for making what may be a politically unpleasant decision.

MR. JENSEN: You also mentioned at some point that there should be a stronger assertion of federal interest. Are you using the terms "federal" and "national" more or less interchangeably?

MRS. WEBSTER: Yes, I would be, but I think that the Federal Government needs to assert a much stronger role in the estuarian zone. I think simply because of national interests that this is important because the estuarian zone is a national heritage and a national asset.

MR. JENSEN: Thank you very much.

CHAIRMAN KLASHMAN: Mr. Bryson?

MR. BRYSON: No.

CHAIRMAN KLASHMAN: Mr. Shaw?

MR. SHAW: No.

CHAIRMAN KLASHMAN: Other members of the panel?

MR. HOWLETT: Mrs. Webster, does your study attack the question of how much marshlands and what intervals would be needed tc maintain the flyway there and whether small isolated areas which may be surrounded by industries are beneficial in the maintenance of that flyway?

MRS. WEBSTER: No, it does not go into this in detail, although I understand that New Jersey has done some studies in which it finds that they lose a tremendous portion of the birds on the flyway if the marshes are destroyed. What is more serious, I think, is the destruction of the value of the marsh for the fish which are dependent on it because the birds have a tendency to find other sites, and they do. They are more adaptable. This does not seem to be true of the fish. They simply decline and decline a great deal.

MR. HOWLETT: Thank you.

CHAIRMAN KLASHMAN: Thank you very much, Mrs. Webster.

Dr. William S. Gaither, Associate Professor of Civil Engineering, University of Delaware.

DR. WILLIAM S. GAITHER: Thank you, Mr. Chairman.

Members of the panel, ladies and gentlemen:

This statement is offered by the Department of Civil Engineering at the University of Delaware. Civil engineers have historically been concerned with the conception, planning and design of works for the control of water and water quality and for marine, harbor and coastal facilities. The Department of Civil Engineering at the University of Delaware continues this professional tradition and shares the concern of all interested people in the threat which domestic and industrial pollution poses to our estuarian and coastal areas.

In addition to our academic duties as teachers and researchers, our Civil Engineering faculty welcomes the opportunity to work with governmental, commercial or private groups in preventing or solving pollution, coastal and oceanographic problems.

Several civil engineering faculty members have special interests directly related to pollution and water resource management as well as to coastal and estuarian processes. Dr. Shank K. Banerji, who, by the way, is in the front row this morning, specializes in sanitary and environmental engineering and micrology.

Dr. Gerald P. Rasmeson, who will join the faculty this fall, will strengthen the area of environmental engineering as well as offering special competence in the fields of water resource system design and water resource management.

Dr. Robert D. Varon, Director of the Water Resources Center at the University of Delaware, offers special competence in the areas of groundwater hydrology, water resources, and engineering geology.

Substantial laboratory facilities are available at the university for research in these areas.

In the areas of coastal and ocean engineering, marine structures, sediment transport and hydraulic model studies, both Dr. William S. Gaither and Dr. Jan M. Jordan, who will join our faculty here in the fall, offer both professional and academic experience.

Some of the specialized areas involving estuarian waters in which we have a current interest are, one, dissolved oxygen balance in connection with nitrification problems in an estuarian system, that is, the rates and kinetics of nitrification in saline waters in the presence of complex organic matter.

Two, a feasibility study for the disposing of treated effluent by means of a neoprene and nylon pipeline from the Wilmington area out into the estuary and beyond.

Three, an analogue model analysis of the brush water-salt-water balance between the DelMarVa Peninsula and the Delaware Estuary. The effect of changing fresh water discharge on encroachment of salt-water is being studied.

The Department of Civil Engineering also works closely with the Marine Biological Laboratories at the university and at Lewes to understand more fully the effects of engineered works on biological life.

The university stands ready to work with any organization, either public or private, who seeks to control pollution and permit man to live in harmony with nature.

Thank you.

CHAIRMAN KLASHMAN: Thank you. Do any members of the panel have any questions?

MR. HOWLETT: Again I am picking on you because according to my list you are the only one speaking for a university here. If this is out of your field, don't hesitate to say so.

Have you conducted any research at the University of Delaware on toxicity of chemicals?

DR. GAITHER: None that I am aware of. Perhaps Dr. Shank Banerji has some information on that?

DR. BANERJI: I think we have done some work on the effect of boron--

CHAIRMAN KLASHMAN: Would you mind identifying yourself?

DR. BANERJI: My name is Shank K. Banerji. I am in the Civil Engineering Department at the University of Delaware, as Bill pointed out, and we are doing work on the effect of boron on the activity of sludge or bacteria. There has been a paper published recently on this. We did find effect of boron on the levels of beyond 25 milligrams per liter. Actually boron is important from the point of view of detergents. There is a lot of boron present in detergents. So we are looking into those aspects, and we might look into other aspects of toxic problems.

MR. HOWLETT: Secondly, have you conducted any research at your university on the effects, good or bad, of the so-called thermal pollution or thermal discharges?

DR. GAITHER: As far as the formal studies are concerned, I know of none, and I see Dr. Banerji nods his concurrence. We are, however, interested in this area and it is a point of considerable discussion among faculty members, even though we have no formal study underway.

MR. HOWLETT: Do you have the capability for it?

DR. GAITHER: Yes, I believe we do.

CHAIRMAN KLASHMAN: Thank you very much, Dr. Gaither.

I should now like to call on Jess W. Malcolm, Executive Director, Chesapeake Bay Foundation.

While Mr. Malcolm is coming up, I should like to explain that it is certainly very appropriate, or I should say it is not inappropriate for someone from the Chesapeake Bay to talk even though we are essentially talking about the Delaware. We have set up these meetings in various parts of the country merely to make it easier for individuals to appear. But there is no reason why, if anybody who has not appeared here, for example, prefers to appear at one of our later meetings in New York, Hartford, Portland or Boston, they should not do so.

In addition, it is also appropriate, because Mr. Jensen is leaving us on Monday from his present position in charge of this National Estuarian Study, to take a position as Regional Director for the Federal Water Pollution Control

Administration in our Charlottesville, Virginia, office. So he, too, is very much interested in anything you have to say about the Chesapeake.

MR. JESS W. MALCOLM: Thank you very much, Mr. Klashman.

I am Jess W. Malcolm, Executive Director, the Chesapeake Bay Foundation, and I am happy to have the opportunity to testify at this hearing on the impact of pollution on the coastal and estuarine waters, since this topic is one of primary concern to the citizens of the Chesapeake Bay country. The Chesapeake Bay Foundation, created to act as an agent for the public, is a privately supported, non-profit charitable, educational and scientific organization concerned solely with the welfare of Chesapeake Bay, including the tidal tributaries, and its existing and potential resource values.

Estuaries provide us with another example of nature's paradoxes. Because tney constitute the inland travel lanes for the world's maritime commerce, they are, by nature, focal points of heavy population and industrial centers. Also, because they are the terminal point of fresh water discharges, they are the ultimate inland recipient for virtually all of man's water borne waste products, including both the B.O.D. active materials originating on adjacent land areas, as well as the biodegradable organic detritis, produced as a result of excessive water enrichment, that is washed in from upstream sources. Furthermore, since estuaries serve as the transition zone between inland fresh waters and the salt waters of the ocean, they are unique ecosystems which produce many of the world's most valuable and sought after biological products. As we can see from this brief example, the paradox is clear, but what of the alternatives?

As a former employee of the Delaware River Basin Commission, I had occasion to analyze predictive data on waste loads entering the Delaware Estuary, as well as to evaluate the five alternative levels of treatment (Objectives Sets I through V), provided by the Federal Water Pollution Control Administration as a part of their DECS study.

When plotted graphically (see attached) these data show a tremendous spread in treatment requirements between OS V, which is the lowest level of treatment that was presented, which was designed to maintain present level conditions, and OS I, which is the highest level of treatment to be given. The range was about 47 to 95 percent UOD removal--under present conditions. However, the plottings also show that as the load increases with time, the degree of treatment required to maintain the established untreated discharge rate also increases sharply. For example, with the B.O.D. discharge held constant, by 1975 the degree of treatment will have been increased to about 74 percent for OS V, and 97 percent for OS I.

By carrying the projection to the year 2010 the degree of treatment would have to be increased to about 90 percent for OS V, and 98 percent for OS I, simply to maintain the water quality status quo. As we move forward in time, the five lines continue to merge into a single line with no discernible difference regardless of the water quality standard adopted. Of course this analogy presupposes that the polluted segment of the estuary would be maintained at some stage short of septic conditions, and that the waste would not be transported elsewhere for instream treatment. While somewhat different values might be used, I believe this trend would apply equally to the other estuaries of the nation.

Thus having gone through the exercise of plotting these data, I became convinced that there can be no long term alternative to estuarine management short of virtually complete UOD and nutrient removal, for to do otherwise it will become necessary, within the foreseeable future, to remove about nine parts of B.O.D. for the privilege of releasing one part, and then do so at the expense of a quality environment.

While our nation has developed, grown and prospered by encouraging virtually unregulated use of our natural resources, we have now matured sufficiently to realize that we are at the end of this era. Economic trade-offs notwithstanding, the alternatives are clear. As a nation we must now begin repairing and restoring past damages or accept, as inevitable, the environmental slum which mankind for centuries has worked so diligently to escape.

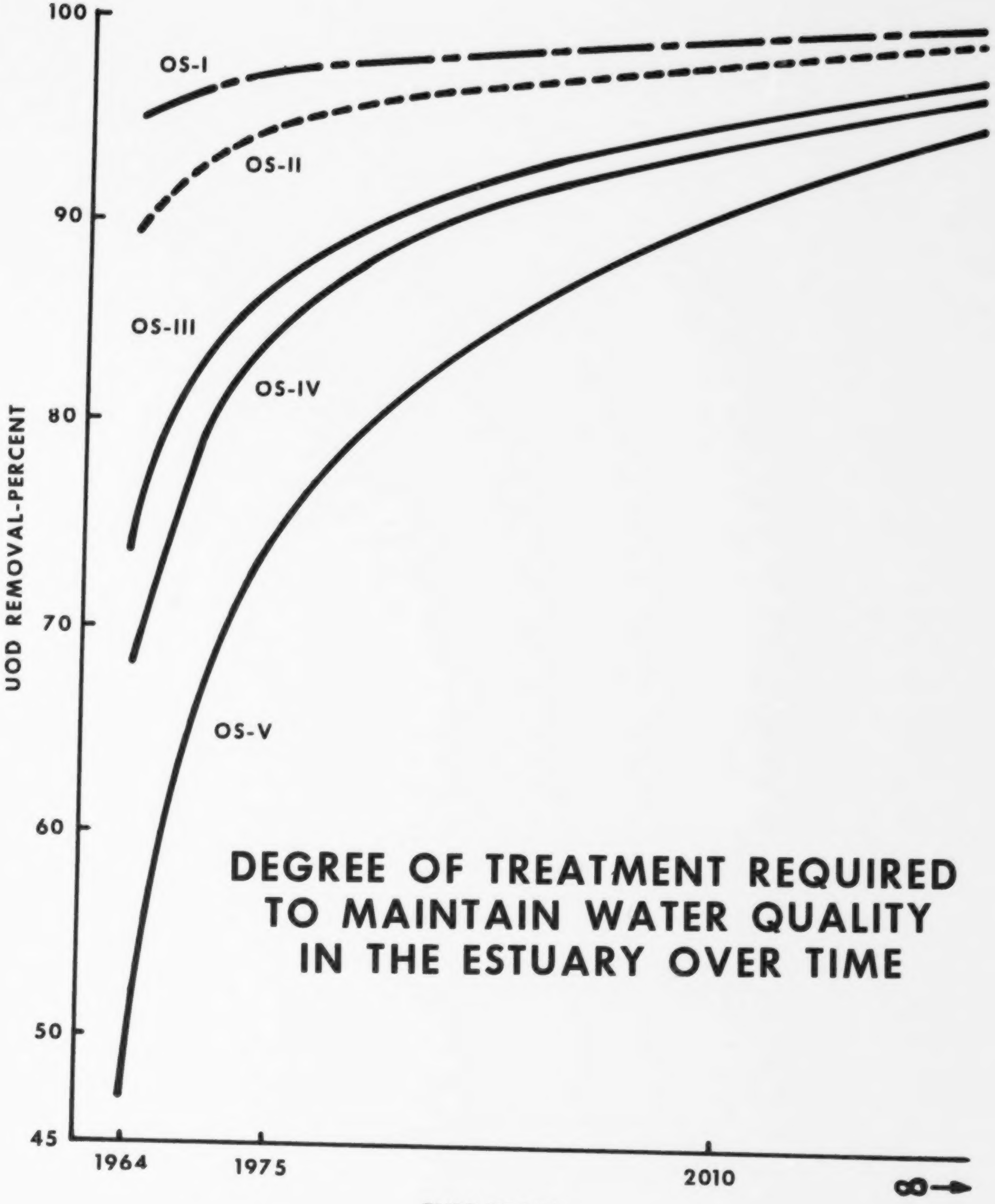
I am well aware that there are those who advocate the building of swimming pools and fishing ponds as alternatives to water quality restoration in the Delaware River Estuary; arguing on the grounds that this course of action is economically more feasible. But is it really? This near-sighted view merely postpones environmental restoration until some future date when the costs will be many times greater, than it would be were the problem fully recognized and a solution sought now. Besides, if the FWPCA predictions are correct, where is the economy in removingnine parts of UOD and discharging one? It certainly cannot be found in a polluted estuary that is unavailable to the many thousands of recreationists who now spend millions annually to travel to other areas of the country and world to enjoy a refreshing swim in the ever diminishing supply of clean water.

Unlike the upper portion of the Delaware River Estuary, which has one of the most severely polluted segments in the nation, Chesapeake Bay is fortunate in having retained much of its original charm and beauty. However, the telltale signs of water quality degradation here, too, are becoming evident. You are all aware of the greatly publicized pollution problem in the Potomac within the shadow of the Nation's Capitol, and of the pollution problem in Baltimore Harbor. However, in addition to these obvious problems, the upper end of the Bay and many of the tidal tributaries are no longer graced with sparkling blue waters, but with the brown-green coloration of heavy algal blooms. Surveys show that nitrates and phosphates are increasing in many parts of the Bay, and that a zone of oxygenless water occurs at depths greater than 30 feet throughout much of the Bay during the summer months. These indices of eutrophication lead experts to predict that we are heading for a serious problem in Chesapeake Bay within the next two decades.

While the FWPCA and other public and private agencies have conducted a number of water quality studies in various parts of Chesapeake Bay, the information they have obtained is not generally known to a wide segment of the public. It is for this reason that we are most anxious to suggest that similar hearings on water quality, dealing more directly with the Chesapeake, be held in Maryland and Virginia.

The Chesapeake Bay Foundation would be most happy to assist you in sponsoring such hearings in order that we might come to grips with our problem before it increases in magnitude to that of the Delaware Estuary, where the fundamental question is not: "Shall we have clean water?" but "How clean shall the water be?"

Thank you.



DEGREE OF TREATMENT REQUIRED TO MAINTAIN WATER QUALITY IN THE ESTUARY OVER TIME

CHAIRMAN KLASHMAN: Thank you very much, Mr. Malcolm.

Mr. Jensen, any questions?

MR. JENSEN: Yes.

CHAIRMAN KLASHMAN: Are you talking now as Regional Director--

MR. JENSEN: I am listening as Regional Director.

Thank you very much, Mr. Malcolm. We do intend to have hearings of this kind or meetings of this kind in all of the coastal zones of the United States. Specific plans have not yet been made for the Chesapeake area. Presumably this will be discussed in the relatively near future to develop plans for this.

You have talked about water quality quite a bit, but you have not said much, if anything, about dredging or filling or long-term community planning, so that these things can be related one to the other. Do you have any thoughts on those?

MR. MALCOLM: Well, I have, of course, thoughts on them as I do on most everything that pertains to the Chesapeake Bay and estuarian systems.

This question, of course, of the hearing today is directed toward that of the question of pollution. We are altering, drastically altering, estuarian systems by a number of activities, not the least of which is dredging which you mentioned and the subsequent filling of marshes and overboard depositions, changing the configuration of bay bottoms. A plan to that effect is now being developed in the Chesapeake Bay.

I think the position I would have to take with respect to that question is that every major environmental change proposed must be accompanied by substantial investigations of the effects on the estuarian system. I don't think all alterations are necessarily bad or evil. I think if we study them sufficiently to understand them, we are then faced with alternatives, some of which might be quite useful and quite beneficial.

MR. JENSEN: Thank you.

CHAIRMAN KLASHMAN: Mr. Bryson?

MR. BRYSON: No.

CHAIRMAN KLASHMAN: Any other members of the panel?

MR. HOWLETT: Mr. Malcolm, for the record are you a biologist?

MR. MALCOLM: Yes.

MR. HOWLETT: How long have you worked in the Delaware River?

MR. MALCOLM: A total of 12 years, Fish and

Wildlife Service.

MR. HOWLETT: In your capacity may I ask a couple of questions that go beyond your statement.

Picking up with what Mr. Jensen asked, in your opinion would selective spoil sites or islands be created in the Delaware Bay to dispose of dredged material without destroying or having a very heavy effect upon the algal system?

MR. MALCOLM: I think it is quite possible that this might be done, yes.

MR. HOWLETT: I have it, on the basis of information given to me by a former employee, that these marshy lands are very productive in terms of food for the fish and other biochemical lands. In your opinion is there a good way of measuring at the present time what the food production of these marshy lands is on any unit basis that you know of?

MR. MALCOLM: Studies have been made which have shown what is contributed by marshes in terms of the nutrient input into the estuarian system. One, as a matter of fact, was undertaken by the State of Delaware that I know of. I believe it was Canary Creek down in the southern part of the state. So there are studies of this kind.

However, I think we are singling out one area for special treatment, and I think rather than do that we should consider the whole. What is the ecological system? What are we talking about in terms of the usefulness of that facility for the system as opposed to a single aspect such as enrichment or the nutrients provided because I think now that some of the enrichment that is coming about artificially is perhaps over-enriching, if you will. The marshes in this case may be providing some ameliorating effect to this load. So it might be a nutrient withdrawal as opposed to a nutrient addition.

MR. HOWLETT: Do you think it is possible to undertake research of a segment of the marshlands to actually measure what they are producing and to determine whether there are ways of increasing the production?

MR. MALCOLM: Well, this is of course an area that has received a great deal of attention in recent years, and not everything is known about it, of course. I would encourage one to investigate further, yes, but to set out to attain results next year or five years or ten years hence I don't think necessarily it would be attainable. But certainly I would encourage all the study possible on things of that type.

MR. HOWLETT: Finally, in your opinion what has been the effect or what is the effect of broad scale spraying for mosquitoes over these marshes as they relate to this productivity that you are talking about to the fish, et cetera?

MR. MALCOLM: The question was spraying?

MR. HOWLETT: Spraying.

MR. MALCOLM: Mosquito control?

MR. HOWLETT: Yes.

MR. MALCOLM: I think that is a very shortsighted and potentially dangerous practice that we find ourselves getting into.

MR. HOWLETT: Thank you.

CHAIRMAN KLASHMAN: Thank you, Mr. Malcolm.

I should now like to call on Mrs. Robert Roop of the Gloucester County Citizens Association.

MRS. ROBERT ROOP: My name is Mrs. Robert Roop. I am a member of the Gloucester County Citizens Association and the Woodbury League of Women Voters. I have been an active observer of the small streams of Southern New Jersey for the last 10 years and have recently gone back to school to do graduate work in the field of limnology under Dr. Ruth Patrick.

I want to talk about the small estuaries of Gloucester County because it is an area in transition and I believe the problems are common to many areas.

Gloucester County borders on the Delaware River below Camden, and with each rising tide the water of the Delaware flows into the New Jersey streams for about five or six miles. Above the head tide the streams are small, extending inland for perhaps only another five or ten miles. At the northern edge of this county the upland is suburban development; at the lower edge of the county it is rural. Below the tide line the streams are broad and rather impressive at high tide. Coal barges ran up to the head tide in many cases as late as the 1940's. Now fixed bridges with clearance only enough for a launch or a rowboat prevent it.

Gloucester County has only 16 or 17 miles of riverfront but with 10 tidal creeks it has about 100 linear miles of estuary, for each one doubles back and forth in a meandering pattern. All streams curl. The winding brook of poetry is in fact correct. And according to Dr. Luna Leopold, chief hydrologist of the Department of the Interior, meandering is the line of least resistance of flowing water, so that the meanders will always reassert themselves even when the channels are straightened.

The acreage flooded at high tide is only five or six thousand acres, mud flats, beds of spatterdock and bullrushes, of no apparent use to the naked eye, yet serving two purposes: First as a marine estuary and second as part of a huge water-purification system. These two are inseparable.

I have to apologize here because so many people have already done a sketch of the ecological system, and I propose to do the same thing, but those of you who already know it will appreciate that it is a hard thing to do, and some of you may find a new angle.

To the marine biologist, the organic nutrients, whether it is organic sewage or rich topsoil washed from the farmland, are the bases of fish food. The dissolved nitrates, phosphates, calcium and silicon are absorbed by the diatoms and filamentous green algae which capture the energy of the sun and convert minerals into living matter, giving off oxygen in the process. These microscopic plants are eaten by protozoa--the still microscopic but lightly larger paramoecia, Euglena, Stentor, Volvox, et cetera, as you remember from Biology I. Tiny crystacea and clam-like copepods, perhaps a half millimeter in length, feed on protozoa and in turn are fed on by the hydra, crayfish, mussels and the fish.

This is a crude sketch of the food web, so intricately intertwined that no part of the system can fail without affecting some other part. The food web is not only to feed the fish, but it keeps the water clean.

Pollutants cause death in some part of the food web. Hot water from a steel refinery may not kill any great number of fish but may continuously kill diatoms and algae.

The result is three-fold:

1. There are no organisms to absorb the nutrients from the water.

2. There are no organisms to produce oxygen in the water.

3. The decaying organisms themselves use oxygen as they fall to the bottom.

This is a measurable phenomenon. The oxygen content of the water drops whenever the diatoms are interfered with, and of course it is especially obvious with the setting of the sun.

Oil floating on the water surface keeps oxygen from the air out of the water and coats the surface of the water plants. It is on the stems and leaves of these water plants that so many of the microorganisms grow, and it is here that the fish spawn and where the young hatch and feed on the microorganisms. The oil again may not kill the fish but it destroys the microorganisms which are the basis of the food chain.

Dumping and landfill are a triple threat because they destroy the spawning grounds of fish, they introduce organic material which use up oxygen from the water, and they cut down on the flood plain so that on any summer day any thunderstorm may produce flash floods, swamping highways, and housing developments simply because the normal floodplain has been filled in. This happens several times each summer on some of the Camden County creeks.

New Jersey has a Sanitary Landfill Law which further complicates the problem. When trash is dumped it must be covered with earth. This is done by bulldozers which carve away solid ground and push it out over the trash in thin layers. Much of this loose dirt is washed into the water with each rain. The sand settles out fairly quickly, filling in the river channels, but the silt is carried far downstream, settling more slowly, smothering water plants and all organisms which live on the stream bottom. The crayfish, clams and mussels which live in sandy stream bottoms are killed by silt. These are filter-feeders, living on dead and decaying matter, so that where there is silt we are deprived of their clean-up function.

Silt is one of the most insidious pollutants, perhaps because it is not evident to everyone that it is harmful. The building of the New Jersey Turnpike 15 years ago created swamps upstream and downstream of the roadbed on almost every creek. In many cases the silt settled out so far downstream that it was not evident that highway construction was the source. And of course it was not the only source. There was a lot of bulldozing for housing developments at the same time. DDT was being used for mosquito control along the creeks, and an increasing number of pesticides were being used on the farms; and it was before the biodegradable detergents. It seems to me there was a very rapid degradation in the streams of our area just about 15 years ago, and it hasn't improved since. But the changes do not occur hour by hour or day by day, and it is very difficult to spot which pollutant creates any given problem.

It is evident that the conditions of the estuaries are not independent of the poisons in the Delaware River water, and they are not independent of the quality of the water that is flowing downstream and in the creeks.

In Gloucester County we are at a moment of crisis in time and in space. At the most populous end of the county Big Timber Creek has a film of oil which coats the water and the plants for about two miles upstream. There is a dump at almost every bend. In the mud at the water's edge you will find only bule-green algae and a great many worms. The hardy spatterdock, which is a kind of water lily, persists and there are a great many black flies. It seems impossible that fish should live there, but a few days ago I saw a bull-head minnow gasping for air at the water's edge.

The next creek down is Woodbury Creek and is not much better. Dumping is justified as good practice because it makes land. Mantua Creek is the next one down and is one of the longest and most beautiful in the county, but its days are numbered because a regional sewage system is proposed which will use the right-of-way of the stream and dig up with dragline and bulldozer the entire length in order to put down the main drainage pipes. The water then will be taken down to the Delaware, given secondary treatment, and discharged directly into the Delaware. In this connection the tidal waters of the county have been zoned Tide-Water III. That is, as I understand it, water in which fish can live but not necessarily spawn. This is about the condition of Big Timber, I guess, since I saw that minnow there.

It is not until you get down to Old Man's Creek, 15 miles downstream from Big Timber, that you find healthy waters. This stream drains farmland and probably still contributes a dollop of healthy water to the Delaware, as all our streams must have done once.

Well, what is the crisis? The condition of the estuaries has become steadily worse in the last 15 years and is still getting worse. The urban population is moving out in concentric rings from the urban centers at the rate of one mile a year. Our county gains about 10,000 people a year. That is 10,000 pounds of sewage a day and 10,000 pounds of trash.

It seems almost impossible to dream of ever restoring the original ecological productivity of the Gloucester County estuaries, but it is essential to restore and maintain conditions in which the natural water-purification process can maintain itself--that is, good enough to support a variety of algae to absorb the dissolved nutrients and produce oxygen, a variety of protozoa to eat the algae, and fish to eat the protozoa and the insect larvae, even if it is only minnows and catfish.

We need a certain specific kind of help I think probably from the Federal Government:

Control of siltation in the construction of highways. Settling basins could be built, constructed wherever silt might reach the streams.

The prohibition of dumping and landfill on the estuaries.

Support of research and development of sewage disposal systems which put the nutrients back on the land.

Support of research and development of biological control of insects, such as killifish, which could be introduced into the streams to eatmosquito larvae and eliminate the use of pesticides in your streams.

Discontinuation of the dredging and straightening of the estuaries.

Perhaps clear-cut action on the part of the Federal Government could set an example for the states and for our County Governments to follow.

Thank you.

CHAIRMAN KLASHMAN: Mr. Jensen?

MR. JENSEN: Does your county have any kind of a sediment control ordinance on construction?

MRS. ROOP: Not that I know of.

MR. JENSEN: Do you have soil conservation districts in the county?

MRS. ROOP: We do have a soil conservation officer, but as the area grows more and more suburban, his work is reduced a great deal and he says that there isn't any contouring being done any more. There is very little activity in that line.

MR. JENSEN: In many urban counties the principal cause of sedimentation is now construction rather than farming, and I think this is a problem that I have heard several people mention in other parts of the country. Does your county have any kind of a county-wide planning or zoning system?

MRS. ROOP: There is a county-wide plan which is on file. One of the provisions of that county plan is that all the streams should be held as open space, and this was one of the provisions that we were tremendously interested in when the plan was put forth about 12 years ago. However, it was not an aspect of the plan which was really adopted at all by any of the county officials nor recognized as important. So nothing has happened in that connection.

MR. JENSEN: So you must have the plan and you must have some way to make it work then?

MRS. ROOP: We find difficulty in making it work.

MR. JENSEN: Thank you.

CHAIRMAN KLASHMAN: Are there any other questions by the panel?

(There was no response.)

CHAIRMAN KLASHMAN: Thank you very much, Mrs. Roop.

Is there anybody else who has not made a statement who wishes to do so?

(There was no response from the audience.)

CHAIRMAN KLASHMAN: If not, may I just ask if you have not made out a registration card, may I suggest that you do so for two reasons: First, we would like to know you are here, and second, we would like to send you each a copy of these proceedings if you want one.

Lastly, if you have not picked up one of these pins, we would like to have you pick one up, wear it, perhaps take one for a friend.

Thank you all very much for coming. We have appreciated your participation. The meeting stands adjourned.

(Whereupon, at 11:30 o'clock A.M., Thursday, June 27, 1968, the meeting of the Federal Water Pollution Control Administration was adjourned.)

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PART II

WRITTEN STATEMENTS

MRS. ROBERT E. BARRETT
220 WASHINGTON AVE.
HADDONFIELD, N. J. 08033

June 3, 1968

Mr John S. Farlow, Regional Coordinator
National Estuarine Pollution Study
North Atlantic Waterquality Management Center
Edison, New Jersey 08817

Dear Mr Farlow:

As a mother of four children I am most concerned about the continued pollution of our costal waters

I would like to go on record for measures which would stop the ruining of one of our most precious resources

We adults should always strive to leave a better world for our next generation — and filth and contamination should have no place in our times or theirs

Sincerely,

Hope H Barrett
(Mrs Robert E. Barrett)

DELAWARE NATURE EDUCATION CENTER
BOX 3900, GREENVILLE, DEL. 19807 • PHONE (302) 658-0204

PRESIDENT
MRS. RICHMOND D. WILLIAMS

EXECUTIVE DIRECTOR
CHARLES E. MOHR

June 14, 1968

Mr. John S. Farlow
Regional Coordinator, National Estuarine Pollution Study
North Atlantic Water Quality Management Center
Edison, New Jersey 08817

Dear Mr. Farlow:

The Delaware Nature Education Center appreciates this opportunity to make its views known to the Federal Water Pollution Control Administration.

We support the work of the Delaware River Basin Commission and our State Agencies concerned, and we feel that this region is ahead because of the standards and controls already set. We concur with most of the findings of previous Delaware Estuary studies, and with the assumptions made in conducting your present study.

The only points I wish to add are in regard to your assumption #2. Both for the protection of water quality and land use "restriction" we urge:

1. Protection and promotion of the natural processes of keeping a body of water clean and healthy.

For example, "preservation" of estuarine and shore line areas which a) produce life for bacterial decomposition, oxygen production, etc.; b) produce and harbour life (shell and fin fish) for food; c) provide natural habitats for those species of life limited to shore environments to help maintain the natural balance of species; and d) act as catchment basins for sediments and nutrients.

We feel that it is necessary to work with nature to assure the future availability of the estuarine natural resources that man needs and wants.

2. DNEC also favors further research to consider both natural values and the effects of human use (economic and social values) on the various estuarine shore areas. We are interested in the establishment of criteria for "land use restriction" based on a priority of values ranging from sensitive natural areas, with no human use to non-sensitive areas for multi-purpose human uses. as noted above

Yours sincerely,

Lynn W. Williams

Mrs. Richmond D. Williams

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THE DELAWARE NATURE EDUCATION CENTER'S OFFICE IS LOCATED AT
INDIAN SPRING NATURE CENTER, BRANDYWINE CREEK STATE PARK, ADAMS DAM ROAD, ROCKLAND

FEDERAL WATER POLLUTION CONTROL ADMINISTRATION HEARING
WILMINGTON, DELAWARE
JUNE 27, 1968

STATEMENT OF JEFF W. NAPIER - OUTBOARD BOATING CLUB OF AMERICA

The purpose of this hearing, to my understanding, is to obtain contributions from interested parties in order to help the Department of the Interior in its management of the nation's estuarine areas. An obvious concern in managing estuarine areas, and our primary concern here today, is pollution control. Other concerns are making optimum use of estuarine areas and determining how this natural resource should be managed generally.

What is the optimum use of an estuarine area? What should be the goal or goals in management of these areas by the Department of the Interior? There are possibly some who would still like to consider estuaries as a handy disposal area for industrial or municipal wastes. Boaters do not share these views.

There are many who feel that a natural resource such as an estuary should be used for the greatest benefit to the greatest number of people - an old democratic concept. This use concept is generally otherwise known as the multi-use concept in recreational circles.

Boaters would largely endorse the multi-use idea for estuarine management as a realistic program to meet the demands for a limited natural resource. We would add one condition, however, The qualification is that we do not feel that the multi-use concept should prevail if such use will destroy the estuary. An estuary is destroyed if some unique and valuable facet of its existence is destroyed. Similarly, we do not think the multi-purpose concept should prevail if it permits one of the uses to so degrade the estuary that the other uses are no longer possible.

The biggest spoiler of unique and valuable estuarine assets is water pollution. The estuarine use most likely to push other users of an estuary out of the picture is the waste disposal or pollution use. Therefore, we boaters favor a multi-use concept for estuarine management - as long as one of the uses is not pollution.

A survey of OBC members on their boating activities was made about a year ago. A nation-wide sampling of about 20% of the membership or about 4,000 persons was taken. The results are informative for our consideration of estuarine management. Forty-three percent of us indicated that we use rivers and coastal waters as our primary boating areas. In many cases, if not most, these areas were estuaries.

Estuarine areas are popular for recreational boating because they offer sheltered waters and a generally good variety of fishing with the close proximity of both salt and fresh water species. Most major estuaries have major cities located nearby which means the estuary is handy for the urban boater. Often they are an enjoyable route to scenic or historical sites. Our concern about estuary management is obvious.

What do boaters use an estuary for? Boating, of course, but that term includes many related activities. Again according to the member survey, ninety-five percent of our members said they spent an average of fifty percent of their boating time just cruising. Sixty-eight percent spent one-third of their time fishing. Sixty-seven percent spent forty percent of their time involved in water skiing. Other boat uses included hunting, swimming, racing and scuba diving. These activities, then, are what should be considered when talking about boating in relationship to estuary management.

What the value of recreational boating is in terms of the health, relaxation and enjoyment of our nation's people is hard to measure like all intangibles. Perhaps an indication can be gained from the fact that there are 8 million recreational craft of all types in use in the U.S. An estimated 40 million people go boating every year. Boat owners are estimated to spend $3 billion on all types of new and used boating equipment, fuel and services every year. And finally, boating has been growing at an annual rate of more than five percent in the last several years. It is safe to say that boating is one of the more popular forms of outdoor recreation and is likely to become more popular.

I could provide many more statistics indicating the value of estuarine areas to recreational boating. For the sake of brevity I will not, but rather trust that the general facts and figures given have indicated the great interest of boaters in estuary management. It naturally follows that we are also greatly concerned with problems of pollution of all waters, including estaurine areas.

Probably boaters have observed first hand more of the damages of pollution and littering of more of this country's waters than any other recognizable group of persons - including FWPCA employees. Few groups have a bigger stake in clean water than boaters. Pollution takes the fish out of our fishing, the health from our water contact sports and the beauty from our shores and beaches. It puts scum on our hulls, the stench of oil, chemicals and garbage in the sea air and substitutes a spectrum of bilious colors for blue water. You don't have to sell boaters on fighting pollution.

We cannot make detailed or technical recommendations on how the massive volume of vile liquids from industrial and municipal sewers can be stopped from entering our boating waters. It is unrealistic to think that all of these pollutants can be stopped tomorrow. Federal grants to municipalities and tax concessions to industry for pollution treatment is one answer over the long haul. Will it be enough before some of our waters are beyond redemption?

Consider, for example, my home area of Chicago on Lake Michigan. Just one steel plant in the huge industrial complex at the south end of Lake Michigan pours 440,000,000 gallons of pollutants into the lake every day according to the Illinois Sanitary Water Board. This amount would fill a receptacle a block square and twenty stories high - every day. Since the south end of the lake is not twenty stories deep, the net result is that several square blocks of water area are thoroughly polluted, surface to bottom, every day from this one plant. I'm sure there are similar examples in the estuaries of this part of the country.

It is almost impossible even to imagine how all the recreational boats in the country could equal the spectacular pollution achievement of this one industrial plant on one body of water. Every one of the 8 million recreational vessels in the country would have to be a veritable floating bathroom all year around to do what this one plant - typical of many industrial and municipal polluters - does in only a day. For example, each of the 8 million motorboats, sailboats, canoes and rowboats, regardless of size, would have to be equipped with a toilet. Each toilet would have to flush 2 gallons of liquid, 3 times an hour, 24 hours a day all year long to equal the 440,000,000 of effluent of this one plant on one body of water. Needless to say, this is not the case.

As a matter of fact, four years ago the National Association of State Boating Law Administrators appointed a Pollution Committee to investigate how shipshape boaters were maintaining our nation's waterways. After an exhaustive nationwide survey, the NASBLA Pollution Committee concluded that pollution from recreational boats was negligible in virtually all waters. A few specific areas of heavy mooring in stagnant water areas were the only exceptions. The Committee further found that less than 10% of the nation's recreational fleet is equipped with marine toilets.

Although pollution from pleasure craft was not found to be a problem, the Committee realized that it could become one in some areas and that the lack of a problem would not necessarily forestall a host of non-uniform legislative "solutions." As a result, the Committee recommended and NASBLA adopted a Model Act on Sewage Disposal and Littering from Vessels as a guide for jurisdictions which felt regulation necessary. The recommended Model Act has since been followed by several key boating states.

The Act prohibits untreated sewage discharges into the waters but allows toilet use with chemical treatment devices meeting certain effluent standards, incineration or holding tanks. Just what a minimum treatment standard should be is now in final stages of a study by the National Sanitation Foundation of Ann Arbor, Michigan. This non-profit testing laboratory is being assisted in this work by state and Federal health officers, the people who have the final say on acceptability of treatment devices in their respective jurisdictions.

Endorsement of the NASBLA Model Act implemented by the Sanitation Foundation's uniform performance standards for watercraft sewage treatment devices has come from many quarters. In addition to endorsement by the Outboard Boating Club of America, the National Boating Federation, a national organization of state boating clubs, is in favor of the approach. So is the National Conference of State Sanitary Engineers.

Granting that regulation of discharges from pleasure craft is inevitable, although not generally warranted at this time, the most ideal solution from the boater's standpoint would be adoption of the NASBLA Model Act by all states - covering both waters of exclusive state jurisdiction and waters of concurrent state-Federal jurisdiction. How can we get all states to do this on a uniform and reciprocal basis?

In the final analysis, Federal legislation setting forth guidelines which the states will be obliged to follow may be necessary in order to secure uniformity. There is precedent for this in the Federal Boating Act of 1958 under which 47 states have complied with Federal standards in exchange for the privilege of numbering pleasure craft on all waters within their territorial limits. In the same manner, NASBLA's model act on waste discharge from boats might be made Federal law. Whether state or Federally administered, boaters would have only one basic law governing them in pollution and littering matters. This answer seems very reasonable, logical, workable and in accord with various Federal water quality control laws which set guidelines but leave primary responsibilities of administration and enforcement to the states. "Creative Federalism," I believe it's called.

Regrettably, this is not the approach being taken by the Federal government. Two study reports of vessel discharges were recently prepared by the Secretary of the Interior through the Federal Water Pollution Control Administration - one for the Congress and one for the President. Boaters feel that both the data presented and the recommendations made by these studies are highly unrealistic.

For example, the studies say that 1.3 million pleasure boats out of the 8 million motorboats, sailboats, canoes and rowboats in the country are equipped with marine toilets. That's one out of every six boats! Yet, a recent survey asking all marine toilet manufacturers how many units they had produced since they were in business indicated total production of all marine toilet manufacturers combined to be only 500,000 to 700,000 units. Even if every unit were still in use, total production over the years has amounted to only half of what the FWPCA report claims are in use.

Clearly the researchers of the report did not consult the National Association of State Boating Law Administrators or the NASBLA Pollution Committee or even knowledgeable boatmen when they came up with further breakdowns on the number and types of recreational craft equipped with marine toilets. The report says that 90 percent of all inboard boats, 80 percent of all outboard boats over 16.5 feet in length and 50 percent of all sailboats without auxiliary power have toilets. For 1966, marine industry sales records show that 81 percent of all sailboats sold without auxiliary power were 15 feet or under and about one third of these the surf-board-with-a-sail type. Yet, according to the report, 50 percent of these sailboats under 15 feet in length have toilets. If this were the case boaters should worry more about indecent exposure than pollution.

In view of the inaccuracy of the FWPCA's impression as to the magnitude of discharges from pleasure craft, we would suggest that closer liaison with boating groups should be developed where none has existed heretofore. As a matter of fact, the National Association of State Boating Law Administrators suggested just that by resolution at their annual meeting in San Francisco last November.

We all want to clean up pollution in our nation's waters and we want estuaries to be unpolluted. Boaters are now and have been for years in the forefront of the fight against pollution. We are and have been supporting legislation which would require us to undertake substantial expenses on our boats to insure that they do not contribute to the pollution of our waters. This legislation, notably the NASBLA Model Act or similar provisions is on the books in several states and will be effective in many others within the next two years.

Yet, on the basis of unsupportable facts, the FWPCA steamrollers ahead ignoring the work that has been done to stop even the minimal discharges contributed by boaters. All boaters throughout the country can't even discharge in a year the equivalent volume produced daily by one industrial plant on one body of water.

In conclusion, I submit, that the FWPCA should more effectively direct its efforts by supporting adoption of the NASBLA Model Act and National Sanitation Foundation standards into Federal law enabling greater devotion to the overwhelming task of cleaning up the major sources of pollution. Only by concentrating on the major sources of pollution will our actions be timely enough and of sufficient magnitude to protect and preserve the waters of our nation's estuaries for all who may wish to use them.

JWN/bhm
1/12/68

STATEMENT FOR THE FEDERAL WATER POLLUTION CONTROL ADMINISTRATION'S PUBLIC HEARING ON THE NATIONAL ESTUARINE POLLUTION STUDY

WILMINGTON, DELAWARE JUNE 27, 1968

Name: Norman G. Wilder

Title: Director

Representing: Delaware Board of Game and Fish Commissioners

Gentlemen:

The Delaware Board of Game and Fish Commissioners is charged with the protection, conservation and propagation of all forms of protected finfish and wildlife within the State of Delaware. The Board is also authorized to operate recreational areas where the public may hunt, fish or camp. Some of these areas are on Delaware River and Bay and are desirable sites for water contact sports including bathing and water skiing. Within the framework of the above duties and authorizations, the Board has a vital interest in the water quality of the Delaware River and Bay and surrounding coastal areas.

Looking to the years ahead, it is now becoming evident that protein from the sea will be relied upon as never before to meet food requirements for a world whose population is increasing at an unprecedented rate. People of this country will be called upon to develop food sources that heretofore have been largely neglected or under-harvested. With the amount of productive land being farmed at close to top predictable yields, it seems logical that the great frontier for new food sources will be marine waters.

It is my purpose here today to emphasize the importance of those parts of the Atlantic Coastal waters known as "estuaries". Most of our domestic marine fisheries harvest in the United States is taken in estuarine waters. Well over half of our domestic fish catch is based on estuarine-dependent species. It is also important for us to understand that the estuaries of the Atlantic and Gulf Coasts are among the most productive in the world, revealed only by somewhat similar areas off the eastern coast of Asia. Long Island Sound, Delaware and Chesapeake Bays, and the sounds of North Carolina are important examples of the type of estuary to which I refer.

It is important to understand that the fisheries productivity of estuaries is brought about because of the blending of fresh and salt waters that occurs, the shelter that they afford, the presence of surrounding marsh lands which are especially efficient food generating areas.

The role that the estuary plays can best be described by references to the Delaware estuary -- one of the bodies of water with which we are concerned today. Let me give examples that explain three important functions which are involved here.

First, the Delaware River and Bay is host to a wide variety of finfish that begin their lives south of Cape Hatteras, and as young fish migrate northward with portions of their populations entering various estuaries, including the Delaware, in the early spring and summer. Here these fish grow rapidly and in some cases are harvested within Delaware River and Bay. In other instances they leave in the late summer and fall to continue their lives in the Atlantic where they become an important part of the coastal fisheries. These fish include sea trout, menhaden, flounders and croaker.

A second example involves fish that enter the Delaware estuary to spawn in the upper reaches of the basin. These are the anadromous fishes such as shad, herring and striped bass. Water of sufficient quality to permit both the passage of spawning adults and the juveniles making their return to the sea is essential for the enhancement of these fisheries which have become severely affected for more than 50 years by pollution in the Delaware.

A third example is oysters, crabs and clams that spend their lives within the Delaware estuary. This group of shellfishes have become tremendously important to the local economy, and I have every reason to believe that despite fluctuations in their numbers they have a great future.

My purpose in outlining the above is to illustrate the significance of the Delaware River Basin to both local inhabitants and to those who make their living from the harvest of fish along other portions of the Atlantic Coast. The water quality that you gentlemen are able to achieve has significance far beyond the four states that are immediately concerned.

Up to this point I have emphasized the role of water quality in the production of marine sources of protein. Not to be overlooked, however, is the need to protect the whole estuarine environment which includes the wetlands bordering the Delaware Bay and similar areas.

These areas serve as the food producing and nursery sites for organisms which, in many instances, find their way into Delaware Bay. A vigorous program of acquisition at federal, state, and private levels together with strong zoning for conservation purposes will be necessary if these estuarine resources are to be protected.

I am confident that you will make every effort to see that the resources of the Delaware River Basin are managed, not only for our local fisheries interest, but as an important part of the total coastal management program.

AMERICAN ASSOCIATION OF UNIVERSITY WOMEN
NEW JERSEY STATE DIVISION
CAMDEN COUNTY BRANCH

June 26, 1968.

Mr. John S. Farlow,
Regional Coordinator,
National Estuarine Pollution Study
N. Atlantic Water Quality Management Center
Edison, N. J.08817

Dear Mr. Farlow:

It does not appear that our membership will have representation at your June 27 open meeting on water pollution. However, our organization does feel great concern about the impact of water pollution on our rivers and coastal waters.

Our membership urges the adoption and implementation of clean water standards for our rivers and coastal waters. We believe that these standards should be designed to preserve our rivers and coastal waters for multiple uses. We favor regional cooperation among communities, states and industries in the adoption and implementation of clean water standards.

Camden County Branch, AAUW, has just completed a year-long study of water pollution problems in Camden County and in the Delaware River Estuary. I served as chairman of the study group which submitted the enclosed resolution to our membership. The resolution was adopted at our May meeting.

Sincerely,

Jeanne Long

Mrs. Frank Long,
Recording Secretary,
Camden County Branch
American Association of
University Women

Enc. 2

AMERICAN ASSOCIATION OF UNIVERSITY WOMEN
NEW JERSEY STATE DIVISION
CAMDEN COUNTY BRANCH

RESOLUTION ON WATER POLLUTION

Action taken May 7, 1968 following a year-long study in Camden County and in the Delaware River Estuary

I. Whereas we the membership of the Camden County Branch, American Association of University Women, recognize the urgency of water pollution as a community problem

And whereas as a matter of policy we endorse and support:

-- continuing scientific study in the field of water pollution research;
-- the adoption of clean water standards for our streams, rivers and coastal waters;
-- the implementation of clean water standards by communities, counties, states and industries;
-- we endorse and urge regional cooperation among communities, counties and states in the implementation of cleam water standards.

II. Be it resolved that we the membership of the Camden County Branch, AAUW, endorse and commend the scientific studies and research techniques pioneered by the Delaware River Estuary Study of the Federal Water Pollution Control Administration. And further be it resolved that we urge the implementation of the water quality standards proposed by the Delaware River Estuary Study and adopted by the Delaware River Basic Commission on March 7, 1968.

III. Be it also resolved that we the membership of the Camden County Branch, AAUW, urge that the communities and industries of Camden County cooperate with state and federal water pollution control agencies in the adoption and implementation of clean water standards for Camden County's streams and rivers. We urge that the communities and industries of Camden County adopt a policy of regional coopration and implementation to insure that Camden County's streams and rivers are brought up to desirable standards of water quality and are preserved from further pollution.

Honeybrook
Downingtown
Coatesville
West Chester
Pa.
Del.
Brandywine Watershed
Wilmington

BRANDYWINE VALLEY ASSOCIATION, INC.
406 Farmers and Mechanics Building
West Chester, Pa. 19380
Phone: 215-696-0475

In reply, please address
West Chester Office

P. O. Box 3700
Greenville, Del. 19807

June 24, 1968

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Mr. Lester M. Klashman, Regional Director
U.S. Department of the Interior
Federal Water Pollution Control Administration
John F. Kennedy Federal Building
Boston, Massachusetts 02203

Dear Mr. Klashman:

The Brandywine Valley Association board of directors recommends that your department and the cooperating agencies establish standards which will improve and protect the quality of water in the Delaware estuary.

The estuary is a very vital part of the water resources of the Delaware Basin.

As you may know, our association has been working actively for twenty-two years to improve the quality of water going into the Delaware Bay. We urge strongly that adequate steps be taken to eliminate pollution from other sources and other tributaries.

We believe that the Local-State-Federal system of management will best provide for development and protection of our estuarine resources.

Sincerely yours,

Robert G Struble

Robert G. Struble
Executive Vice-President

RGS:mas

*The National Federation of State & Regional Boating Organizatio

NATIONAL BOATING FEDERATION

P. O. BOX 8, JENKINTOWN, PA. 19046

July 3, 1968

Mr. Lester Klashman, Reg. Dir.
National Estuarine Pollution Study
Federal Water Pollution Control Administration, Northeast Region
U. S. Department of the Interior
John F. Kennedy Federal Building
Boston, Mass. 02203

Dear Mr. Klashman:

In response to your kind invitation, we submit herewith our statement for the record of your meeting in Wilmington, Delaware, held 27 June 1968.

Thank you for including this in the record.

Sincerely,

Robert E. Synnestvedt (S)

RES:bms
Enclosure

Robert E. Synnestvedt
President

* *The National Federation of State & Regional Boating Organizati*

NATIONAL BOATING FEDERATION

P. O. BOX 8, JENKINTOWN, PA. 19046

STATEMENT OF ROBERT E. SYNNESTVEDT

President, National Boating Federation

For the Record of the Public Meeting on
Impact of Pollution on Our Coastal Waters

Federal Water Pollution Control Administration
United States Department of the Interior

Held at Wilmington, Delaware, June 27, 1968

Among the member organizations of the National Boating Federation are the following: Pennsylvania' Boating Association, Federated Boatmen of New Jersey and the Chesapeake Bay Yacht Clubs Association. With these and our many other state and regional boating organizations, we believe we are the largest broad-based, purely amateur (non-commercial) boating organization in the country. Incorporated in Washington, D. C., we are non-profit in the strictest sense of the word. As an elected officer, I bring you a concensus of the boating public.

No segment of the American public is more vitally concerned with water quality, especially in our estuarine and coastal waters, than America's boatmen. We must have clean water for enjoyment of our pastime, for cruising, swimming, fishing and all the boating-related activities that make our sport the greatest outdoor family recreation in the world. It follows naturally that we have been examining the problem of estuarine pollution over many years. It is not something new to us. Our findings, however, indicate that boats do not contribute even a measurable amount to the pollution existing today, and that all of the boats equipped with toilets could not in one season contribute the equivalent of the outfall of a single small city during a heavy rain.

Nevertheless, we are willing to play our part in any reasonable and practical plan to clean up our precious waters, even to set an example. If the pollution from municipal sewage and industrial wastes can be reduced by fifty percent, we will go the additional mile and reduce ours by sixty percent.

What we fear are impractical regulations based upon assumptions and theories that will not work afloat. One must remember that only a tiny fraction of the eight million boats plying our nation's waters today have toilets aboard. In fact, all of the marine toilets produced by the industry since 1936 total only about 700, 000 units. This means that if there really is a problem of pollution from boats, it rests with the tiny little boats that do not have toilets aboard, and not with the very few that Even if Congress should outlaw the bucket, we do not believe any restriction placed upon these little boats would prove practical or enforcable. When the laws of nature clash with the laws of man, the laws of nature will prevail.

The National Boating Federation feels that much more study of water pollution is required to pin point responsibility and then set a priority list for eliminating the major offenders. We do not feel that the tiniest offender --boating-- should be placed at the top of the list simply because it is more vulnerable to attack.

At our Spring meeting in the Chicago Yacht Club, the NBF voted unanimously the following recommendation:

> "That no legislative or administrative action be taken that would force upon the boating public devices which have not been proved practical in marine use, or which do not conform to the safety and performance standards of the American Boat and Yacht Council and the National Sanitation Foundation."

DELAWARE WILD LANDS, INC.
1014 WASHINGTON STREET
WILMINGTON, DELAWARE 19801

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July 2, 1968

Mr. Lester M. Klashman, Regional Director
U. S. Department of the Interior
Federal Water Pollution Control Administration
John F. Kennedy Federal Building
Boston, Massachusetts 02203

Dear Mr. Klashman:

I am enclosing a statement which I request be made part of the official record of the public hearing of the Federal Water Pollution Control Administration on the National Estuarine Pollution Study of June 27, 1968 in the Hotel duPont.

Very truly yours,

Edmund H Harvey

Edmund H. Harvey
President

EHH/mlb

Enclosure

STATEMENT FOR THE FEDERAL WATER POLLUTION CONTROL ADMINISTRATION'S PUBLIC HEARING ON THE NATIONAL ESTUARINE POLLUTION STUDY
WILMINGTON, DELAWARE JUNE 27, 1968

Name: Edmund H. Harvey

Title: President

Representing: Delaware Wild Lands, Inc.

Gentlemen:

Delaware Wild Lands, Inc. is a non-profit tax exempt conservation organization which purchases land considered to be essential to the conservation of natural resources in Delmarva. Organized in 1961, we now own approximately 8,000 acres of wetlands, adjoining farmland and cypress swamps and forests. We own considerable acreage on the Delaware estuary. One of our main goals is to acquire lands which, in conjunction with those dedicated to conservation by state and federal agencies, will attain a good balance between lands set aside for their natural resource values and those which can be developed for other purposes. We cooperate with the State and Federal conservation agencies in their land acquisition programs.

We believe that the water quality standards adopted by the Delaware River Basin Commission and approved by the states of New York, New Jersey, Pennsylvania and Delaware to be realistic and that the next step is implementation of these standards for the area covered by the Delaware River Basin Commission. The water quality of the lower estuary and bay is, in some cases, higher than the standards adopted by the Commission. Therefore, we believe that higher standards should be adopted for the lower estuary and bay.

The Delaware State Planning Office's Comprehensive Shoreline Plan for the State of Delaware calls for most all river and bay front south of the Chesapeake and Delaware Canal to be used for conservation and recreation. Other land use studies more or less advocate the same uses as the above plan. Therefore, it would seem that more land use studies would be superfluous and time-wasting. Obviously, the Delaware River Basin Commission and the four states plus the Federal Government represented on that Commission are satisfied that sufficient land use studies have been made since they have established water quality standards for the waters under their jurisdiction.

Delaware Wild Lands, Inc. urges that the highest water quality standards be adopted for the lower estuary without further delay.

Edmund H. Harvey
President
Delaware Wild Lands, Inc.

EHH/mlb

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PHILADELPHIA PORT CORPORATION
1105 MALL BUILDING, PHILADELPHIA, PA. 19106 (215) WALNUT 5-9301

July 15, 1968

Mr. John S. Farlow, Regional Coordinator
National Estuarine Pollution Study
North Atlantic Water Quality Management Center
Edison, New Jersey 08817

Dear Mr. Farlow:

The Philadelphia Port Corporation desires to include this statement in the record of public meetings which were conducted on the impact of pollution on coastal and estuarine waters on June 27, 1968, in the Grand Ballroom, DuPont Hotel, Wilmington, Delaware.

As a matter of policy, the Port Corporation endorses the control of pollution within the Delaware River estuary and is cooperating with the appropriate agencies with the goal of producing realistic port oriented controls. The Delaware River Port from Trenton to the Sea has been for nearly 300 years a leading ocean port in world commerce. The port is the area's most valuable economic asset, returning some $6,000,000 daily in direct and indirect benefits.

Much progress has been made toward the reduction and control of pollution within the port area and its tributary streams over the past 20 years. Additional measures on the part of municipalities, industries and shipping interests generally will produce further progress over the future.

Our prime concern is:

1) That realistic goals and controls in keeping with the nature of of the port be adopted.

2) That the controls be administered uniformly in all the nation's leading ports.

We very much appreciate the opportunity of registering our comments. We will be pleased to answer any questions or to enter into any discussions which you may propose.

Yours very truly,

Beatty

Royce E. Beatty
Deputy Executive Vice President

REB:JAK

CITY OF PHILADELPHIA

SAMUEL S. BAXTER
COMMISSIONER

WATER DEPARTMENT
1160 MUNICIPAL SERVICES BUILDING
PHILADELPHIA, PA. 19107

August 5, 1968

Mr. Lester Klashman, Regional Director
Water Pollution Control Administration
2303 J.F. Kennedy Federal Building
Boston, Massachusetts 02104

Dear Mr. Klashman:

I trust that I am not too late in submitting to you some comments in connection with the National Estuarine Pollution Study.

Our knowledge and comments will be restricted for the most part to the Delaware Estuary with which we are familiar. Because of the tremendous population and port activity in the immediate vicinity of Philadelphia, we suggest that uses of the estuary at Philadelphia are decidedly different from those uses where the estuary approaches the bay. We do, however, have interest in coastal waters since we now use them for disposal of sludge, and intend to do so in the future.

In your notice of the Wilmington meeting you suggested several questions which might be answered. I am repeating the questions in order to direct my comments at specific points.

1. What are the values "aesthetic, personal, recreational, dollar, etc." of an estuary?

Aesthetically, the estuary can be considered of great value to those who have occasion to look at the river and use it for certain forms of recreation, such as boating, within the Philadelphia area. On the other hand, where the estuarine waters are in an intimate contact with coastal areas, the recreational aspects would seem of great importance for water contact sports such as swimming and water skiing and other water associated activities such as boating and fishing.

Establishing a dollar value to the estuary is somewhat difficult. During the course of the Delaware Estuary Comprehensive Study, a dollar value was fixed to the estuary. This had its basis, for the most part, on the recreational value and possible increase in fish life, but as the DECS did indicate, the cost-benefit ratio was not favorable to a large expenditure of funds which is now contemplated under the existing regulations for the Delaware Estuary.

We believe that the concept of zoning estuarine and coastal waters for beneficial uses should be looked at from not only the viewpoint of recreational and fish life, but from the idea that some areas may be used for waste disposal or for such things as treatment plant effluents.

If the estuary is not available or if the estuary will have limited availability for use to assimilate liquid waste, then the cost for treatment for municipalities will, of course, increase.

We recognize that the National Estuarine Pollution Study will pose certain economic problems. We would like to identify an economic problem where we feel further research and study is required. Due to the all encompassing nature of the estuarine proposal, it is obvious that it will have its impact on all resources: land, water, air and humans. Heretofore, economic studies have been restricted to the confines of the study project usually resolving in cost-benefit ratios for the justification of the project. In our opinion, economic evaluations for the National Estuarine Pollution Study must recognize the monetary needs of other national and regional resources. This procedure will tend to inhibit improper pricing policies which can only result in inefficient utilization of the water resources or of other resources.

2. How have they been damaged by pollution, and how much?

The answer to this question depends on one's viewpoint. As it is with many things in life, decisions are required as to what is most beneficial to the individual or agencies concerned.

The Delaware River - as it is today - serves as a good source of water for the City of Philadelphia, and also as a receiving stream for the effluent from the City's treatment facilities. It is also one of the largest ports in the United States, and from the viewpoint of tonnage handled, we believe it is the greatest in the United States. So from one viewpoint, pollution has not damaged the river. This would be the objective point of view from our standpoint as engineers.

From the viewpoint of the individual who is interested in fishing, the absence of a minimum quantity of oxygen reduces the number of fish and, on occasions, has caused fish kills. This, of course, is not to be desired by him and should be corrected.

There is no doubt that the ecology of an estuary is affected by pollution. The ecology of an estuary because of its complexity is not clearly understood. After all, the water itself varies in composition and in temperature as it mixes with the fresh water and progresses seaward. Living organisms have certain environmental requirements. Nature has a way of acclimating or changing itself to meet changes in environment. There is no doubt that pollution alters the ecology of an estuary. There is evidence in current literature that indicates because of this influence by pollution, estuaries do not respond to recovery in the same manner as ordinary streams.

We would like to comment on your idea that certain estuaries should be reserved as wild undespoiled things of nature. Your idea was also that certain estuaries should be used in a manner to recognize the needs and wants of man and the industries that he has to have to support these things. For prosperity, industries are required. It is industry that creates jobs; it is jobs that furnish the money required to purchase the things we need and make a community prosperous, including payment for those measures that control pollution. What we should strive for is a happy medium. That is, a level of quality in the estuary which we can afford.

Can you have millions of people inhabiting the banks of an estuary and yet have the estuary itself devoid of some pollution? Perhaps some day as our treatment technology advances, this could be economically feasible. As it is today, to accomplish this will require tremendous expenditures and the technology to do this is, at best, doubtful.

3. What do you think the fate of our coastal zones should be?

The answer to this question has been partially considered in previous paragraphs. A summary statement would be this, that we would all like our coastal zones to be as they were visualized before being polluted by man and industry, but man and industry are part of the prosperity which we are now experiencing. The future of our coastal zones depends on the amount of money we can afford to spend.

4. What are the best uses of our estuaries?

This also has been covered in some of the statements above, but from an engineering standpoint, it is an economic decision. What is of paramount importance is that the uses must be ascertained with deliberateness and justified. The uses should not depend on whims and fanciful thinking. The uses should depend on a realistic point of view. We say this because decisions on the uses will then decide the water quality criteria that are necessary to establish and support these uses and, in turn, determine the rules and regulations that have to be promulgated, and the monies that have to be spent.

5. What system of management, local, state and federal, will best provide for development and protection of our estuarine resources?

There is no doubt that some agency similar to the DRBC, which is the coalition of states and federal government, will have to be formed for a successful and workable project of this nature. The only comment we have here is that large municipalities that have a considerable stake in the future use of estuaries should have some authority in the decisions that are made concerning the use of estuaries.

Theoretically, the municipality is represented by the state but in practice, the state may not give the municipality adequate and proper representation. There should be some sort of a legal device which would establish rapport between municipalities and industry with the regulatory agency.

We may be repeating ourselves, but quite a few higher echelon personnel in the Water Department have assisted in the DECS. Some of us were actually chairmen of important committees. Since this is the case, we know that recommendations made by municipalities, industries and many public groups were discarded. A good example of this would be the recommendation by the Water Use Advisory Committee that Objective Set III be adopted for the Delaware Estuary.

Of the four committees that composed the Water Use Advisory Committee, three of the committees representing, in essence, the population and industry of the estuary, recommended Objective Set III and yet the decision was made by the DECS and the state to adopt Objective Set II. An examination of the DECS Report will verify this and a review of the estimated cost will also verify that the cost for implementing Objective Set II was appreciably greater than Objective Set III, with the only increased benefit being a possible 10% increase in fish every 25 years.

It is still unbelievable that the DRBC and the states involved would adopt Objective Set II over Objective Set III even though various committees determined that Objective Set III would be satisfactory at this time.

It is suggested that the composition of the work force which would make the estuarine studies be augmented to include such people as public relation advisors in addition to administrators, engineers and technicians. The business of a public relation agency would not only disseminate items for publicity, but also the raw data and the results of the studies to interested researchers and individuals or agencies concerned with the study.

General Comment

The difficult part of deciding what should be done with polluted estuaries is that we do not know enough about them to formulate corrective action which might not be a waste of money. The most important thing that should be done and done immediately would be to embark on an intensive study to determine what the proper ecological balance should be in an estuary. To simply require the construction of hundreds of treatment plants not knowing whether this will really solve the problem is not the right way to proceed. Until one knows the source of the problem, his chances of solving the problem are minimal.

Requirements for secondary removal is a reasonable request. To require tertiary treatment before we understand what is going on in an estuary is unnecessary and should await the availability of more information concerning the biology of an estuary.

There is much information in literature concerning the Hudson River, the Delaware River, and the Thames which supports the feeling by many people experienced in the field of water pollution control that increasing the treatment removals does not necessarily improve the condition of an estuary. There are factors involved which, as yet, have not been adequately explained.

Very truly yours,

Samuel S. Baxter
lmg

SAMUEL S. BAXTER
Commissioner

JERSEY SHORE BRANCH

AMERICAN ASSOCIATION OF UNIVERSITY WOMEN

76 Darlington Road
Deal, N. J. 07723

July 12, 1968

Mr. John S. Farlow
Regional Coordinator, National Estuarine Pollution Study
North Atlantic Water Quality Management Center
Edison, New Jersey 08817

Dear Sir,

We, the Jersey Shore Branch, American Association of University Women, have received invitations to public meetings for the National Estuarine Pollution Study. The first of these was held in Wilmington, Delaware on June 27, 1968 and the other (at which we plan to have two representatives) to be held at Caspary Auditorium, Rockefeller University, N. Y. We would like to submit the following written statement applicable to both public meetings.

We are in agreement with your Report on Pollution Of The Navigable Waters of Eastern New Jersey, Shark River to Cape May, dated September 1967, as regards values of an estuary, extent of damage by pollution, the future and best uses of our coastal zones and estuaries. We are basically in agreement with your proposals for the system of management to best develop and protect our estuaries. However, we feel that presentation of the problems our area now faces with water pollution, economically and aesthetically, needs to be stressed more emphatically to encourage greater concern on the part of the general public so that it in turn will support legislators in favor of prompt action toward pollution abatement, and will urge the incumbents to review their positions and take more aggressive measures.

Sincerely,
Mrs. T. B. Blaisdell
Mrs. T. B. Blaisdell
Community Problems Area Representative

STATEMENT

by the

DEPARTMENT OF CIVIL ENGINEERING

UNIVERSITY OF DELAWARE

Civil Engineers have historically been concerned with the conception, planning, and design of works for the control of water and water quality and for marine, harbor and coastal facilities. The Department of Civil Engineering at the University of Delaware continues this professional tradition and shares the concern of all interested people in the threat which domestic and industrial pollution poses to our estuarine and coastal areas.

In addition to our academic duties as teachers and researchers, our civil engineering faculty welcomes the opportunity to work with governmental, commercial, or private groups in preventing or solving pollution, coastal and oceanographic problems. Several civil engineering faculty members have special interests directly related to pollution and water resource management as well as to coastal and estuarine processes.

Dr. Shankha K. Banerji specializes in sanitary and environmental engineering and microbiology. Dr. Gerald P. Rasmussen, who will join the faculty this fall, will strengthen the area of environmental engineering as well as offering special competence in the fields of water resource system design and water resource management.

Dr. Robert D. Varrin, Director of the Water Resources Center at the University of Delaware, offers special competence in the areas of ground water hydrology, water resources, and engineering geology. Substantial laboratory facilities are available at the University for research in these areas.

In the areas of coastal and ocean engineering, marine structures, sediment transport, and hydraulic model studies, both Dr. William S. Gaither and Dr. Jan M. Jordaan, who will join our faculty here in the fall, offer both professional and academic experience.

Some of the specialized areas involving estuarine waters in which we have a current interest are:

1. *Dissolved oxygen balance in connection with nitrification problems in an estuarine system (i.e., rates and kinetics of nitrification in saline waters in the presence of complex organic matter).*

2. *A feasibility study for disposing of treated effluent by means of a neoprene and nylon pipeline from the Wilmington area out into the estuary and beyond.*

3. *An analog model analysis of the fresh-water-salt-water balance between the Delmarva Peninsula and the Delaware estuary. The effect of changing fresh water discharge on encroachment of salt water is being studied.*

The Department of Civil Engineering also works closely with the Marine Biological Laboratories at the University, and at Lewes, to understand more fully the effects of engineered works on biological life. The University stands ready to work with any organization, either public or private, who seeks to control pollution and permit man to live in harmony with nature.

The Water Resources and Environmental Engineering Facilities occupy two separate rooms. The largest room is equipped for the chemical and biological analysis of water and contains as permanent equipment laboratory tables, exhaust hood, balance and microscope tables, autoclave, ovens, incubators, etc. A 20° centigrade walk-in room and refrigerator are also available. The total space available is approximately 2000 square feet of which 830 square feet is a research laboratory. A unique feature of that lab is an exhaust duct to the roof which may be utilized during air cleaning studies. This research laboratory is located over the chemical area and is provided with a removable floor for experimental arrangements of unusual height. The principal laboratory is air conditioned. Equipment for these laboratories includes most of the conventional equipment such as balances, microscope, constant temperature bath, pH meters, etc. together with a good selection of specialized water and wastewater analysis equipment such as stability indicator, turbidimeter, conductobridge, COD apparatus, Kieldahl N apparatus. Also available are research pieces such as a spectrophotometer, polarograph, rotary viscometer, Warburg respirometer, and a D.O. probe which measures up to one part per billion of dissolved oxygen.

The Fluid Mechanics Laboratory covers over 3000 square feet and has 500 square feet of storage area for special equipment. The three main facilities of this lab are a free surface hydrodynamic tank with flows to 4000 gpm, a sub-sonic wind tunnel with speeds up to 130 ft./sec. and having a test section of 12' x 18" x 18", and a 4' x 20' ripple-tow tank for studies of wave and coastal processes as well as towed body studies. In addition of these facilities, there are wave tanks and smaller flumes as well as an area of 1700 square feet including a tow tank 120 feet long. This tow tank is adaptable for other fluid mechanics research. Excellent facilities for flow visualization studies, including appropriate high speed cameras, hydrogen bubble method, etc. are in use in these facilities.

SHANKHA K. BANERJI

Assistant Professor, Department of Civil Engineering; B.S.C.E. Calcutta University 1957; M.S. 1962 and Ph.D. 1965, University of Illinois.

Specialty: Sanitary engineering, environmental engineering, microbiology and water resources.

Experience: Worked as Assistant Engineer with Hindustan Steel, Ltd. India, in the Public Health Engineering Design Division 1957-1960, concerned mainly with design and installation of water supply and waste disposal facilities; Research Assistant on research projects of Sanitary Engineering Department, University of Illinois 1960-1965; Assistant Professor, Sanitary Engineering Department, University of Illinois 1965-1966; Assistant Professor, University of Delaware 1966-. Membership in ASCE, Water Pollution Control Federation, American Water Works Association, National WPCF Research Committee, Kent County Sewer Study Board. Registration as a professional engineer in Delaware. Consultant to various industrial groups.

Awards-Honors: Sigma Xi

Publications: Author of one dozen reports and publications in the fields of his specialization.

WILLIAM S. GAITHER

Associate Professor, Department of Civil Engineering; B.S.C.E. Rose Polytechnic Institute 1956; M.S.E. Princeton University 1962; M.A. Princeton University 1963; Ph.D. Princeton University 1964.

Specialty: Structures, coastal structures, harbor hydraulics, heavy construction, marine construction, systems analysis.

Experience: Ayrshire Collieries Corporation, Indianapolis, Indiana, Chief of party 1954-1956· Dravo Corporation, Pittsburgh, Pa., Design Field and Research Engineer 1956-1960; Meyer Corporation, Neenan, Wisconsin, Design and field engineer and field superintendant 1960-1961; Princeton University, lecturer, teaching assistant and research assistant 1962-1964; Associate Professor, University of Florida 1964-1965; Supervising Engineer and Chief Engineer for Port and Coastal Development, Bechtel Corporation, San Francisco, California 1965-1967; Associate Professor, Civil Engineering Department. University of Delaware 1967-. Professional engineer in Delaware, Pennsylvania, California, Alaska, Wisconsin, and Florida.
Member ASCE, ASEE, AAUP, MTS.

Awards-Honors: Arthur LeGrand Doty Fellow 1961-1962; Ford Foundation Fellow 1962-1964, Princeton University.

Publications: Author of many publications and lectures in his fields.

JAN M. JORDAAN, JR.

Associate Professor, Department of Civil Engineering; B.S.C.E. University of Witwatersrand, Johannesburg, S. Africa 1952; M.S. University of Wisconsin 1953; C.E. Massachusetts Institute of Technology 1955; Sc.D. Massachusetts Institute of Technology 1958.

Specialty: Ocean and coastal engineering, sediment transport, coastal hydraulics, oceanography.

Experience: Assistant Hydraulic Engineer with South African Department of Irrigation and Water Affairs 1952 and 1958-1959 concerned with hydraulic structures and model testing; Research Assistant on unsteady flow resistance and turbulent diffusion at Massachusetts Institute of Technology 1953-1955 and 1957-1958; Junior Project Engineer on water distribution system and water supply design and network analysis with Metcalf and Eddy, Consulting Engineers of Boston 1956; Senior Research Officer and Head of Hydraulics Section in charge of research projects on marine disposal of effluents, beach erosion and harbor siltation, including large scale-model studies, South African Council for Scientific and Industrial Research 1959-1963; Research Hydraulic Engineer on kinematics and run-up of impulsively generated waves on beaches and waterfront structures, 1963-1965; Associate Professor & Director of Look Oceanographic Engineering Laboratory concerned with teaching and research in hydraulic and ocean engineering at the University of Hawaii, 1965-1968; Associate Pro fessor concerned with teaching and research in ocean engineering at the University of Delaware 1968-. Member of South African Institution of Civil Engineers, Marine Technology Society, International Association for Hydraulic Research, RESA, ASCE, International Oceanographic Foundation, Hawaiian Academy of Sciences.

Awards-Honors: Sigma Xi

Publications: Author of many publications in his field.

GERALD P. RASMUSSEN

Assistant Professor, Department of Civil Engineering; B.S.C.E. University of Washington 1958; Ph.D. Oregon State University 1968.

Specialty: Water resources system design and management, environmental engineering.

Experience: Worked as an Engineering Assistant in the materials testing laboratory of Boeing Co. 1956-1957; Draftsman and Inspector with Phillip M. Botch, Consulting Engineer, 1957-1958; Junior Mechanical Engineer and then Mechanical Engineer concerned with oilfield surface facilities, drilling, and as staff advisor to the operating department of Shell Oil Company 1958-1964; Teaching Assistant Oregon State University 1964-1965; Assistant Professor of Civil Engineering, University of Delaware 1968-.

Awards-Honors: Boeing Company Scholarship 1954, U.S. Public Health Service Traineeship Award 1965-1968.

ROBERT D. VARRIN

Assistant Professor, Department of Civil Engineering and Director, Water Resources Center; B.S.E. Princeton University 1956, M.S.E. Princeton University 1957, Ph.D. University of Delaware 1968.

Specialty: Ground water hydrology, geo-hydrology, water resources.

Experience: 1957-1959, Hydrologist, Uhl, Hall & Rich, Consulting Engineers Niagara Falls N,Y. 1959-1962, Lecturer, Department of Geology Columbia University; 1960-1962, Hydrologist, U.S. Geological Survey; 1962-1967, Assistant Research Professor of Geology, University of Delaware. 1962-1966, Hydrologist, Delaware Geological Survey; 1965-Director, Water Resources Center, University of Delaware, Consulting: Ground Water consultant for State Highway Department, City of Newark and Geraghty & Miller, 1968 Assistant Professor of Civil Engineering, University of Delaware.

Awards-Honors: Phi Beta Kappa, Sigma Xi.

Publications: Senior author on three papers concerning ground water research (one published & two in press) and Junior author on two others (one Delaware Geol. Survey Publication and one HRB Publication in press).

THE GARDEN CLUB OF WILMINGTON, DELAWARE

July 11, 1968

Mr. John S. Farlow, Regional Coordinator
National Estuarine Pollution Study
North Atlantic Water Quality Management Center
Edison, New Jersey 08817

Dear Sir:

The Conservation Committee of the Garden Club of Wilmington appreciates the opportunity to go on record urging that positive steps be taken by the state and federal authorities to control the pollution of the estuarine system including the tidal waters of Delaware and the Delaware River estuary, the shore and adjacent land, and the biology and ecology of the coastal areas of the States of Delaware, Pennsylvania, and a portion of New Jersey.

We believe public action is sorely needed to appropriately develop, effectively manage, and wisely use and protect important coastal water and marsh resources in the brackish zone between sea and fresh water.

We urge that federal, state and local governments will cooperate in insuring protection for one of this country's great natural resources.

Sincerely,

Greta B. Layton

Greta B. Layton
Co-Chairman, Conservation

GBL/bm

The Philadelphia Maritime Exchange
EXCHANGE FLOOR, THE BOURSE
WILLIAM A. HARRISON, SECRETARY
WA 5-1522 (AREA CODE 215)
REPORTING STATIONS
DELAWARE BREAKWATER, DEL.   MARCUS HOOK, PA.

H. WILLIS JACKSON, PRESIDENT
W. S. OBERHOLTZER, TREASURER

JOHN W. PINNEL, VICE-PRESIDENT
LESLIE C. KRUSEN, SOLICITOR

PHILADELPHIA, PA. 19106

July 11, 1968

Mr. Lester M. Klashman, Regional Director
Federal Water Pollution Control Administration
United States Department of the Interior
John F. Kennedy Federal Building
Boston, Massachusetts 02203

Dear Mr. Klashman:

While this Organization, because of other business, was unable to have representation at the Wilmington, Delaware public meeting on the impact of pollution on our coastal waters, we should like to assure you of our interest in the National Estuarine Pollution Study.

The Philadelphia Maritime Exchange is a non-profit organization, founded in 1875, and is comprised of numerous individuals and companies concerned with maritime affairs in the Ports of Philadelphia. In addition to the collection and dissemination of maritime information, the purpose of The Exchange is to encourage and promote trade and commerce in the Delaware River Ports.

We have long recognized that clean waterways bear a direct relationship to the health, growth, and prosperity of our City and to our Port, and that they can contribute to our major interest, which is increased trade and commerce. We should therefore be glad to provide access to our statistical facilities to any member of your study group in the event that this would be of assistance. Primarily, the information which we collect is related to vessels and their cargoes calling at the Ports of Philadelphia. Should this information be related to your study, please feel free to call on us.

Sincerely yours,

William A. Harrison
Secretary

WAH:ec

STATEMENT AND RESOLUTION OF THE WISSAHICKON VALLEY WATERSHED ASSOCIATION, INC. AND THE DELAWARE RIVER WATERSHEDS ASSOCIATION TO THE FEDERAL WATER POLLUTION CONTROL ADMINISTRATION IN RE ITS PUBLIC HEARING IN WILMINGTON, DELAWARE ON JUNE 27, 1968 ON THE IMPACT OF POLLUTION ON COASTAL AND ESTUARINE WATERS OF THE STATES OF DELAWARE, NEW JERSEY AND PENNSYLVANIA

The Wissahickon Valley Watershed Association is a non-profit, non-partisan corporation, organized in 1957 to promote by educational programs and studies, and to coordinate, the restoration, conservation and improvement of the quality of the watershed's natural resources and environment.

Its office is located in Fort Washington, Montgomery County, Pennsylvania. Fifty-four square miles of the rapidly urbanizing watershed are located in Montgomery County; 10 square miles within the city of Philadelphia. The membership of the Association totals approximately 700.

The Delaware River Watersheds Association, a non-profit corporation, organized in 1959, is comprised of those individuals, both professional and non-professional, who are charged with the responsibility of carrying on and moving ahead the natural resources management activities and projects of small watershed associations in Delaware, New Jersey and Pennsylvania.

The objectives of the Association are to share knowledge and experience for the mutual benefit of all watershed groups; to analyze problems which affect watersheds in the area and to make recommendations; to foster the watershed approach to resources development; to assist, when requested, with the formation of new watershed organizations.

Of all the ways in which man alters his estuarine environments pollution is one of the most insidious. It is, at the same time, no less sure in its ultimate effects. But these effects are often not readily apparent, and, in many cases, these effects and their implications are not clearly understood.

Because even pristine estuaries, unsullied by man's wastes, are highly complex entities, the segregration of the effects of man from those from natural sources are, more often than not, difficult at best.

Estuaries are characteristically enriched situations, and for this reason capable of supporting the many kinds and individuals of plants and animals which spend all or parts of their lives within their confines.

Thus, in attempting to deal with the effects of man's wastes upon our estuaries, we are faced with a formidable array of variables and unknowns. Of all the ecosystems which man would like to manage, the estuary presents the greatest number of problems, both existing and potential.

Certain facts are evident, however, and it is upon these facts that the concern and position of each of these Associations are based:

1) Populations will change and continue to increase, and the changes and increases, in many cases, can be predicted.
2) The total volume of man's wastes will increase, and to a large extent the increase is predictable.
3) Certain new and unpredictable wastes will enter the scene.
4) Sedimentation from all types of development will increase.
5) Normal flows will decrease, as the result of urbanization and reduced ground water recharge; low flows will become more critical, and periods of low flow will be extended.
6) Flood peaks and occasions of heavy runoff will increase.
7) The need for flow regulation, both from the standpoint of dilution of pollutants and manipulation of salinity within estuaries, will intensify.
8) The demand for estuarine uses will continue to increase in the face of a dwindling supply of habitats.
9) Without detailed studies of estuaries to establish the contribution of their various segments to the overall productivity, it is not possible to predict the damage to aquatic resources, to evaluate it, and to plan protective measures.
10) The extent to which the successful completion of the life histories of many estuarine species is dependant upon estuaries is not known.
11) The degree to which estuarine water quality management should be based upon the abundance at any given time of specific aquatic organisms is unknown.
12) Each estuary represents an entirely individual situation, with unique, contributing influences from its tributaries. For this reason, pollution control can only be effective if carried out on an individual watershed basis.

13) Because public understanding and support is mandatory for effective and prompt control of the quality of our estuaries, strong efforts must be made to convince the public of the importance of estuarine pollution control to the nation's economy and to the well-being of its people.

New water quality standards and criteria, and the rules and regulations which govern them, have already been approved for the Delaware River Estuary in accordance with the requirements of the Federal Water Quality Act of 1965. Undoubtedly other estuaries are similarly advanced.

The Act does provide for review and revision of standards in the light of changing technology of waste production and waste removal and advances in knowledge of water quality requirements developed through research. Certainly every effort should be made to take full advantage of this provision.

Completion of a national estuarine pollution study prior to the consideration of the new standards and criteria required by law would have provided more accurate and realistic bases for the complex decisions which had to be made in the development of the new standards and criteria. Hopefully the National Estuarine Pollution Study, estimated for completion in 1969, will be utilized immediately as the basis for a reconsideration and, in many cases, an upgrading of the existing standards and criteria.

WHEREAS, the foregoing statement represents the views of the Wissahickon Valley Watershed Association and the Delaware River Watersheds Association regarding the present and potential problems which must be faced in maintaining and improving the quality of our estuaries and coastal waters as related to land and water uses; and

NOW, THEREFORE, BE IT RESOLVED that the Boards of Directors of the Wissahickon Valley Watershed Association and the Delaware River Watersheds Association request that the National Estuarine Pollution Study proceed with all due haste with its objectives of 1) documenting and analyzing the various aspects of estuarine pollution and, following establishment of these bases, of 2) making recommendations for a comprehensive plan for the preservation, study, use and development of the estuaries and coastal waters which will provide for the long-term public good, and, concomitantly, provide equitably for the rights and practices of the many different users of these waters.

By action of the Board of Directors of the Wissahickon Valley Watershed Association at its regular meeting on June 12, 1968; and

By action of the Board of Directors of the Delaware River Watersheds Association at its annual meeting on June 27, 1968.

Thomas Dolan
President, Wissahickon Valley Watershed Association
Treasurer, Delaware River Watersheds Association

APPENDICES

List of Participants at Wilmington, Delaware Public Meeting, June 27, 1968. 135

List of Other Attendees at Wilmington, Delaware Public Meeting, June 27, 1968 136

Name	Address
Speakers	
John H. McDonald	Leg. Asst. for Rep. William V. Roth, 1628 Longworth HOB, Washington, D. C. 20515
John E. Babiarz	Mayor, City of Wilmington, Public Bldg., Wilmington, Del.
Carmen F. Guarino	Dep. Comm., Water Dept. City of Phila.
John T. Carson, Jr.	Dir., Div. of Natural Resources, Bucks County, Pa., Administration Bldg., Doylestown, Pa.
Morris B. Smith	V. Chairman - Water Resources Comm. Chemical Industry Council, N. J. 94 Sun Valley Road, Toms River, N.J. 08753
Mrs. R. J. Kallal	Del. Delegate, LWV - Interleague, Council of the Del., 518 Kerfoot Farm Road, Wilmington, Del.
Ralph L. Dodge	Exec. Vice Pres. Upper Chesapeake Watershed Assoc., Inc., Box 6, Cecilton, Md., 21913
W. H. Roach	Sup. Pollution Control Texaco Ind. Sub Com-TAC/DECS, P. O. Box 98, Woodbury, N. J. 08096
Eleanor M. Webster	Conservation oundation, 308 S. Isseminger St., Phila., Pa. 19107
Dr. William S. Gaither	Assoc. Prof. of Civil Engineering, Univ. of Delaware, 285 du Pont Hall, Newark, Del.
Jess W. Malcolm	Exec. Dir., Chesapeake Bay Foundation P. O. Box 209, Annapolis, Md. 21404
Mrs. Robert Roop	Gloucester Co. Citizens Assoc. Sewell, N. J.

Name	Address
Attendees	
Ross E. Anderson, Jr.	Exec. V. P., Del. State Chamber of Commerce, 1102 West Street, Wilmington, Del. 19801
Wanda B. Adamson	Water Committee, LWV, 1105 Farm (?) Rd., Wilmington, Del. 19803
S. K. Banerji	Asst. Prof., Univ. of Delaware, Newark, Delaware 19711
Bruce T. Birnhak	Fish & Wildlife Service, 6816 Market St., Upper Darby, Pa.
Ashworth Burslem	Mgr. Press Relations, Hercules, Inc., Wilmington, Del.
Mrs. R. L. Bennett	Sec'y. Delaware Wild Lands 1014 Washington St., Wilmington, Del. 19801
John C. Bryson	Exec. Dir., Del. Water & Air Resources Comm., Dover, Del.
John I. Cahalan	County Engr., New Castle County, P.O. Box 165, Wilmington, Del.
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